3-6665-225-12

TECHNICAL MANUAL
OPERATOR'S AND ORGANIZATIONAL MAINTENANCE MANUAL

ALARM, CHEMICAL AGENT, AUTOMATIC: PORTABLE,

MANPACK, M8 (NSN 6665-00-935-6955); FIXED EMPLACEMENT, M10 (NSN 6665-00-169-1446); FOR TRUCK, UTILITY, 1/4 TON, M11 (NSN 6665-00-169-1447); FOR TRUCK, 3/4 TON, M12 (NSN 6665-00-169-1448); FOR TRUCK, 2 1/2 TON, M13 (NSN 6665-00-169-1449); FOR FULL-TRACKED ARMORED PERSONNEL CARRIERS AND RECOVERY VEHICLES, M14 (NSN 6665-00-169-1450); FOR CARRIER, COMMAND AND RECONNAISSANCE ARMORED, M15 (NSN 6665-00-169-1451); W/POWER SUPPLY FOR TRUCK, UTILITY, 1/4 TON, M16 (NSN 6665-00-169-1452); W/POWER SUPPLY FOR TRUCK, 3/4 TON, M17 (NSN 6665-00-169-1453); AND W/POWER SUPPLY FOR TRUCK, 2 1/2 TON, M18 (NSN 6665-00-169-1454)

HEADQUARTERS, DEPARTMENT OF THE ARMY
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HEADQUARTERS
DEPARTMENT OF THE ARMY
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CHAPTER 1

INTRODUCTION

Section I. GENERAL

1-1. Scope

These instructions are for use by the operator and organizational maintenance personnel. They apply to the following 10 alarms, later referenced as alarm systems:

a. Alarm, Chemical Agent, Automatic: Portable, Manpack, M8.

b. Alarm, Chemical Agent, Automatic: Portable, Fixed Emplacement, M10.

c. Alarm, Chemical Agent, Automatic: Portable for Truck, Utility, 1/4 Ton, M11.

d. Alarm, Chemical Agent, Automatic: Portable for Truck, 3/4 Ton, M12

e. Alarm, Chemical Agent, Automatic: Portable for Truck, 2 1/2 Ton, M13.

f. Alarm, Chemical Agent, Automatic: Portable for Full Tracked Personnel Carrier and Recovery Vehicles, M14.

g. Alarm, Chemical Agent, Automatic: Portable for Carrier, Command and Reconnaissance, Armored, M15.

h. Alarm, Chemical Agent, Automatic: Portable, W/Power Supply, for Truck, Utility, 1/4 Ton, M16.

i. Alarm, Chemical Agent, Automatic: Portable, W/Power Supply for Truck, 3/4 Ton, M17.

j. Alarm, Chemical Agent, Automatic: Portable, W/Power Supply, for Truck 2 1/2 Ton, M18.

1-2. Record and Report Forms

a. Department of the Army forms and procedures used for equipment maintenance will be those prescribed by TM 38-750. The modification and use of DA Form 2408-1 is described in paragraphs 2-19, 2-20, and 4-7.

b. You can improve this manual by recommending improvements using DA Form 2028 (Recommended Changes to Publications and Blank Forms) or DA Form 2028-2 (test) located in the back of this manual. Mail the form direct to Commander, US Army Armament Materiel Readiness Command, Attn: DRSAR-MAS-C, Aberdeen Proving Ground, MD 21010. A reply will be furnished direct to you.

1-3. Administrative Storage

Refer to TM 740-90-1 and chapter 5 for administrative storage instructions on the alarm systems.

1-4. Destruction to Prevent Enemy Use

Refer to TM 43-0002-31 for procedures for destruction of equipment to prevent enemy use.

Section II. DESCRIPTION AND DATA

1-5. GENERAL

Each alarm system detects very low concentrations of chemical-agent vapors or inhalable aerosols and automatically signals the presence of chemical agents. The equipment may be operated continuously but must be serviced every 12 hours.

1-6. Major components and Associated Equipment

(fig. 1-1)

The following major components and associated equipment are combined to form the 10 alarm systems:

a. Detector Unit, Chemical Agent Automatic Alarm: M43.

b. Alarm Unit, Chemical Agent Automatic Alarm: M42.

c. Refill kit, Chemical Agent Automatic Alarm: M229.

d. Battery, Dry, Medium Duty, 36V: BA3517/U.

e. Battery, Dry, 1 1/2V: BA3202/UF or Battery, Dry, 1 1/2V: BA3030.

f. Power Supply, Chemical Agent Automatic Alarm: M10.

g. Installation Kits (Each adapts a particular vehicle to a mounting kit.)

h. Mounting Kit, Chemical Agent Automatic Alarm: High Profile, M228 or Mounting Kit, Chemical Agent Automatic Alarm: Low Profile, M182.

i. Telephone cable, type WD1TT.

j. Winterization Kit, Automatic Chemical Agent Alarm: M253.

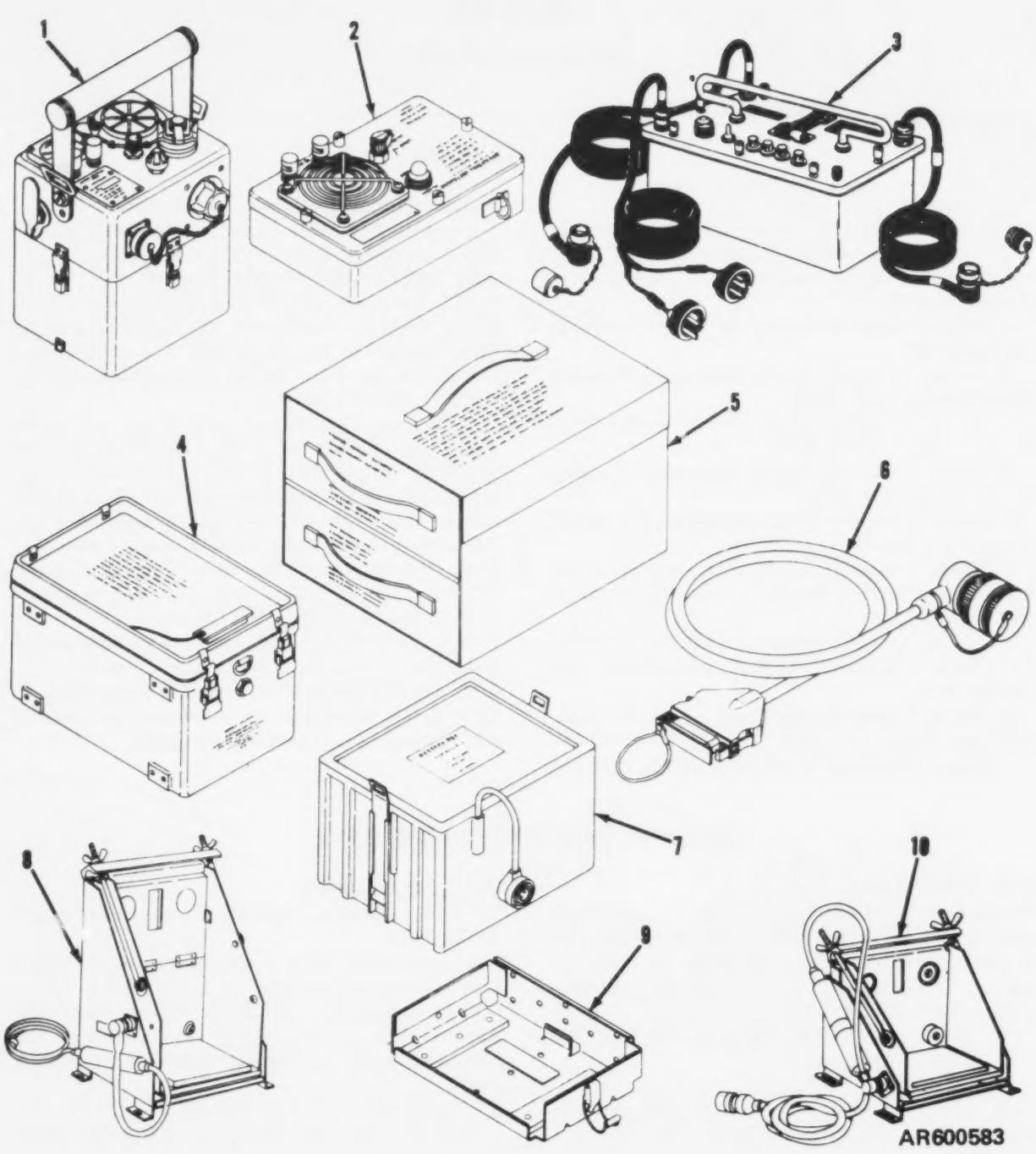
k. Rucksack and shelf.

1-7. System Configurations

NOTE

An Asterisk indicates an expendable item (table 1-3).

a. M8 Alarm System. The M8 alarm system is for hand-carry or backpack operations. It consists of the following equipment:



1 Detector Unit, Chemical Agent Automatic Alarm: M43
2 Alarm Unit, Chemical Agent Automatic Alarm: M42
3 Power Supply, Chemical Agent Automatic Alarm: M10
4 Battery, Storage, BB501/U
5 Refill Kit, Chemical Agent Automatic Alarm: M229
6 Cable Assembly, Power, Electrical: M168
7 Battery, Dry, Medium Duty, BA3517/U
8 High profile mount, part of Mounting Kit, Chemical Agent Automatic Alarm: High Profile, M228
9 Bracket, part of Mounting Kit, Chemical Agent Automatic Alarm: High Profile, M228 and Low Profile, M182
10 Low profile mount, part of Mounting Kit, Chemical Agent Automatic Alarm: Low Profile, M182

Figure 1-1. Major components of alarm systems.

(1) One M43 detector unit.
(2) One M42 alarm unit.
(3) *One M229 refill kit.
(4) *One BA3517/U battery.
(5) *Four BA3030 batteries.

b. M10 Alarm System. The M10 alarm system is used at fixed emplacement installation. It consists of the following equipment:

(1) One M43 detector unit.
(2) One M42 alarm unit.
(3) *One M229 refill kit.
(4) *One BA3517/U battery.
(5) *Four BA3030 batteries.
(6) One M10 power supply.

c. M11, M12, and M13 Alarm Systems. These three systems are used on selected wheeled vehicles. The M11 alarm system is used on a 1/4-ton utility truck, the M12 alarm system is used on a 3/4-ton truck, and the M13 alarm system is used on a 2 1/2-ton truck. The installation kit supplied in each system mechanically and electrically adapts the vehicle to accept an M228 high profile mounting kit. The high profile mount supplied secures the M43 detector unit and the BA3517/U battery to a front fender of the vehicle. Each alarm system consists of the following equipment:

(1) One M43 detector unit.
(2) One M42 alarm unit.
(3) *One M229 refill kit.
(4) *One BA3517/U battery.
(5) *Four BA3030 batteries.
(6) One applicable installation kit.
(7) One M228 mounting kit.

d. M14 and M15 Alarm Systems. The M14 and M15 alarm systems are for selected full-tracked-vehicle installations. The M14 alarm system is used on full-tracked personnel carriers and recovery vehicles, and the M15 alarm system is used on command and reconnaissance armored carriers. The installation kit supplied in each system mechanically and electrically adapts the vehicle to accept an M182 low profile mounting kit. The low profile mount supplied secures the M43 detector unit to the front of the vehicle without disrupting the basic silhouette of the vehicle. Each alarm system consists of the following equipment.

(1) One M43 detector unit.
(2) One M42 alarm unit.
(3) *One M229 refill kit.
(4) *One BA3517/U battery.
(5) *Four BA 3030 batteries.
(6) One applicable installation kit.
(7) One M182 mounting kit.

e. M16, M17, and M18 Alarm Systems. These three alarm systems are used on selected wheeled vehicles. Each includesan M10 power supply for use when the M43 detector is removed from the vehicle for temporary fixed operation at the organization site. The M16 alarm system is used on a 1/4-ton utility truck, the M17 system is used on a 3/4-ton truck, and the M18 alarm system is used on a 2 1/2 ton truck. The installation kit supplied in each system mechanically and electrically adapts the vehicle to accept an M228 high profile mounting kit. The high profile mount supplied secures the M43 detector unit and the BA3517/U battery to a front fender of the vehicle. Each alarm system consists of the following equipment:

(1) One M43 detector unit.
(2) One M42 alarm unit.
(3) *One M229 refill kit.
(4) *One BA3517/U battery.
(5) One M10 power supply.
(6) *Four BA3030 batteries.
(7) One applicable installation kit.
(8) One M228 mounting kit.

1-8. Items Troop Installed or Authorized

In addition to the equipment supplied as part of each alarm system, additional items are authorized to the operator to complete the system configuration.

a. Rucksack and Shelf. When the M8 alarm system is used in the backpack configuration, the operator is authorized a rucksack and shelf.

b. Telephone Cable. The operator is authorized and must requisition two-conductor, telephone cable to connect the M42 alarm unit when installing the M8 and M10 alarm systems. Telephone cable must also be used when connecting additional M42 alarm units in all alarm systems.

c. M253 Winterization Kit. The operator is authorized to requisition an M253 winterization kit for operating the M8 and M10 alarm systems in temperatures below +20 °F. The M253 winterization kit consists of two BB501/U batteries and one M168 cable.

(1) *BB501/U battery.* The BB501/U battery is a rechargeable, heavy-duty, nickel-cadmium battery.

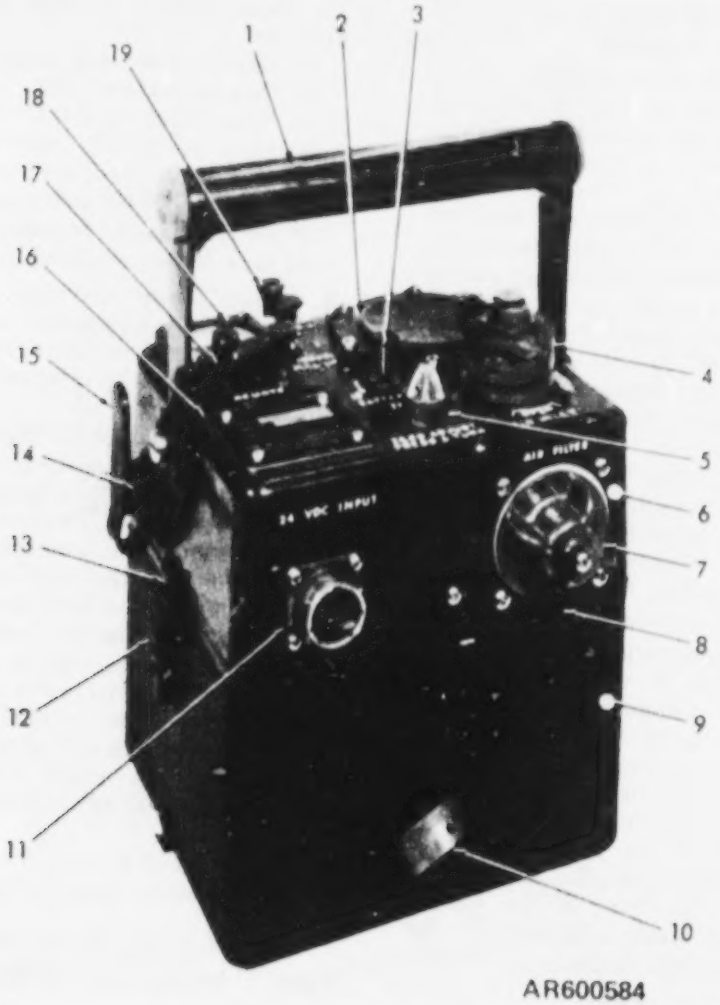
(2) *M168 cable.* The M168 cable connects the BB501/U battery to the M43 detector or the M10 power supply. The cable is 50 inches long and is terminated at one end with an SCL-6028/4-3 connector and at the other end with a PT05A-14-5P or KPT47024-311 connector.

1-9. M43 Detector Unit

The M43 detector unit senses the presence of chemical agents in the air and produces an audible signal. The M43 detector unit consists of a detector unit assembly (6, fig. 1-2) secured to a

bottom case assembly (9) by four clamping catches (12).

a. Detector Unit Assembly. Attached to the detector unit assembly (6) are a handle (1), a horn (2), a BATTERY TEST switch and HORN VOL control (3), an AIR INLET assembly (4), a ZERO ADJUST knob (5), and AIR FILTER plug (7), an electrical connector cover (10), two chains (8) that attach the AIR FILTER plug and connector cover, a 24 VDC INPUT receptacle (11), four clamping catches (12), four bottom catches (13), two strap fastener loops (14), an AIR OUTLET cap (15), an identification plate (16), two REMOTE binding posts (17), a meter (18), and hand crank (19). The handle (2, fig. 1-3) contains a RAINSHIELD assembly (1) and a FLOWMETER (3). A chassis (4) is mounted to the underside of the detector unit assembly. Mounted to the chassis (4) are four electrical contacts (5); a pump assembly (7), secured by two catches (6); a detector cell (8), secured by a bail (9); an electronic module (10), secured by a turnlock



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1 Handle
2 Horn
3 HORN VOL-BATTERY TEST switch
4 AIR INLET assembly
5 ZERO ADJUST knob
6 Detector unit assembly
7 AIR FILTER plug
8 Chain
9 Bottom case assembly
10 Electrical connector cover
11 24 VDC INPUT connector
12 Clamping catch
13 Bottom catch
14 Strap fastener loop
15 AIR OUTLET cap
16 Identification plate
17 REMOTE binding post
18 Meter
19 Hand crank

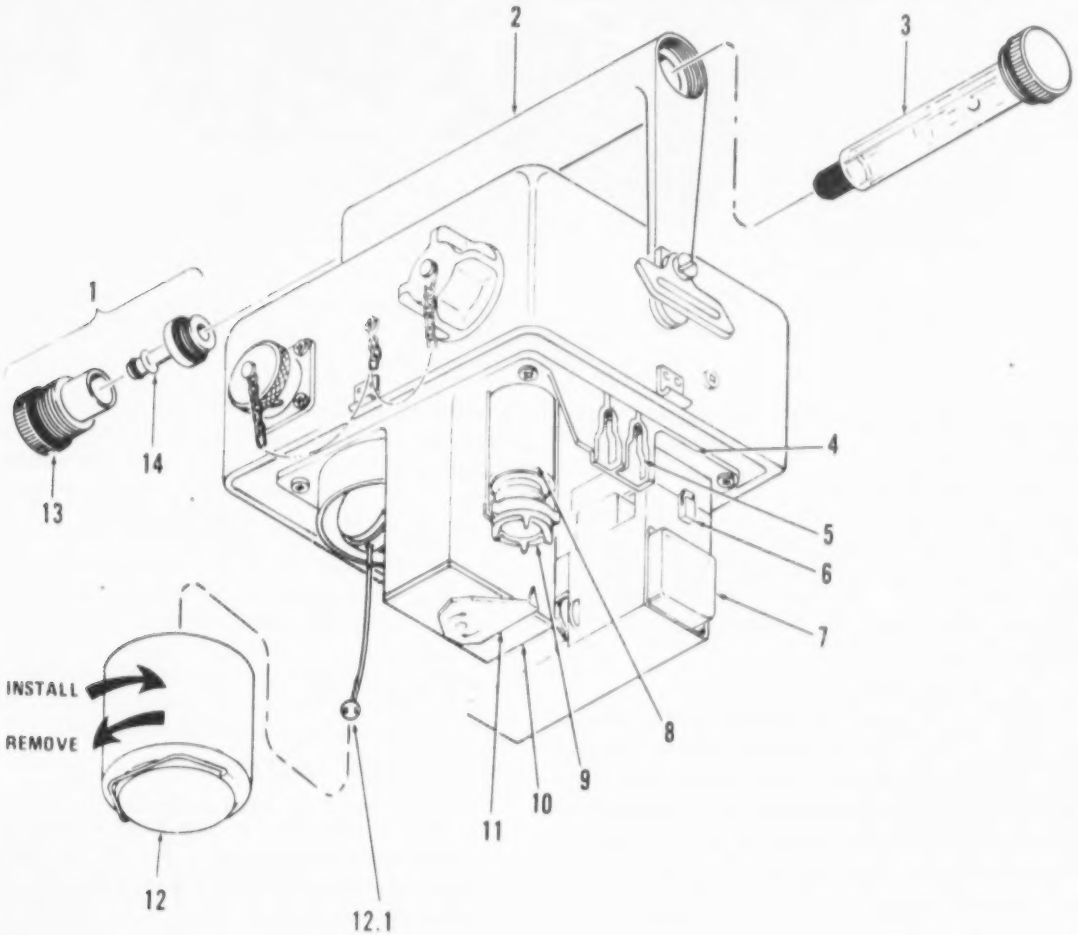
Figure 1-2. M43 detector unit.

fastener (11); and a reservoir assembly (12), which screws into the chassis (4).

b. Bottom Case Assembly. Mounted to the outside of the bottom case assembly (9, fig. 1-2) are an instruction plate (3, fig. 1-4); two catches (4) that attach a BA3517/U battery; and four clamping catches (5) that secure the bottom case assembly to the detector unit assembly. A seal (1) fits in a groove around the top of the bottom case assembly to insure that the interior of the M43 detector unit is watertight and airtight when the bottom case assembly is secured to the detector unit assembly. Electrical resistance heaters are embedded in the double-walled case of the bottom case assembly. Two pairs of heater contacts (2) mate with contacts (5, fig. 1-3) in the detector assembly. When the M43 detector unit is operated below 40 °F., the heaters are automatically turned on and off to maintain 40 °F. within the bottom case assembly.

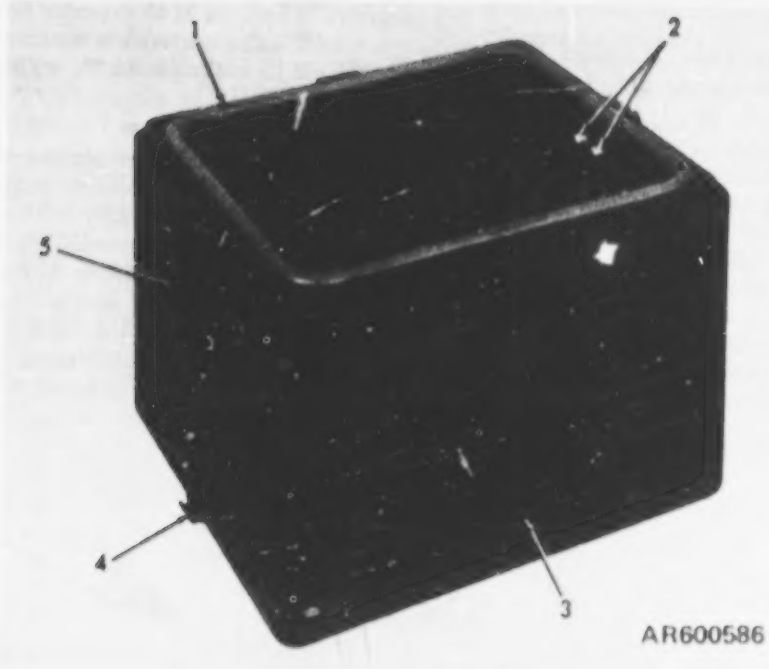
1-10. M42 Alarm Unit

The M42 alarm unit, when connnected to the M43 detector unit provides a remote audible and visual signal or visual signal only whenever the M43 detector unit senses chemical agent. The M42 alarm unit consists of a panel (1, fig. 1-5) secured to a housing (4) by four knurled screws (9). The panel contains an ALARM RED indicator (3), a loudspeaker (5), an identification plate (6), two binding posts (7), and a selector switch (8). Two



1 RAINSHIELD assembly
2 Handle
3 FLOWMETER
4 Chassis
5 Contact
6 Catch
7 Pump assembly
8 Detector cell
9 Bail
10 Electronic module
11 Turnlock fastener
12 Reservoir assembly
12.1 Weight assembly
13 Rainshield
14 Adapter

Figure 1-3. Detector unit assembly.



1 Seal
2 Contacts
3 Instruction plate
4 Catch
5 Clamping catch

Figure 1-4. Bottom case assembly.

D-rings (2) are fastened to the housing (4). Four BA3030 batteries are secured in the housing.

1-11. M10 Power Supply

The M10 power supply (3, fig. 1-1) requires input power of 115 or 220 volts at 50, 60, or 400 Hertz, found at fixed installations, and produces an average output of 29.5 volts dc. Additional descriptive data on the M10 power supply is in TM 3-6665-261-14.

1-12. Mounting Kits

a. M228 Mounting Kit. The M228 mounting kit is used to electrically connect and mount the M43 detector unit and the M42 alarm unit to a wheeled vehicle. The kit consists of a high profile mount (8, fig. 1-1) and an alarm unit mounting bracket (9). The high profile mount consists of an electrical cable assembly and an inner wrap assembly that is shock mounted to an outer wrap assembly by six resilient mounts. TM 3-6665-273-20 describes the M228 mounting kit.

b. M182 Mounting Kit. The M182 mounting kit is used to electrically connect and mount the M43 detector unit and M42 alarm unit to a tracked vehicle. The kit consists of a low profile mount (10, fig. 1-1) and an alarm unit mounting bracket (9). The low profile mount consists of an electrical cable assembly and an outer wrap assembly, and an inner wrap assembly. Six resilient mounts shock mount the inner wrap assembly to the outer wrap assembly. TM 3-6665-273-20 describes the M182 mounting kit.

1-13. Installation Kits

Each installation kit mechanically and electrically adapts a specific vehicle to accept an M43 detector unit, an M42 alarm unit, an M228 or M182 mounting kit, and in some cases, refill kit components and a BA3517/U battery. TM 3-6665-274-20 describes the installation kits.

1-14. M229 Refill Kit

(fig. 1-6)

The M229 refill kit contains materials for 15 days of continuous operation. The kit consists of a sleeve (4), two drawers (1), and a plastic strap (2) that is discarded when the refill kit is first opened. The sleeve (4) and the drawers (1) are constructed of water-resistant corrugated fiberboard. The expiration date of the kit is marked on the sleeve (4). Each drawer (1) contains 15 solution reservoirs (5), one sensitivity check bottle (6), and 30 air filter packages (7). Each air filter package consists of an air filter (10), a plastic wrapper (9) in which the air filter is enclosed, and a watertight

1 Panel
2 D-ring
3 ALARM-RED indicator
4 Housing
5 Loudspeaker
6 Identification plate
7 Binding posts
8 Selector switch
9 Screw

Figure 1-5. M42 alarm unit.

bag (8) in which the plastic wrapper containing the air filter is sealed. Each drawer is provided with a handle (3).

1-15. BA3517/U Battery

The BA3517/U battery supplies primary power to the M43 detector unit when the alarm system is hand-carried or backpacked. When the alarm system uses an M10 power supply as a primary dc power source, the BA 3517/U battery is connected as a standby power source. The BA 3517/U battery (fig. 1-7) has a plastic case, metal strap (1), clamping catch (3), identification plate (2), and cable assembly (4).

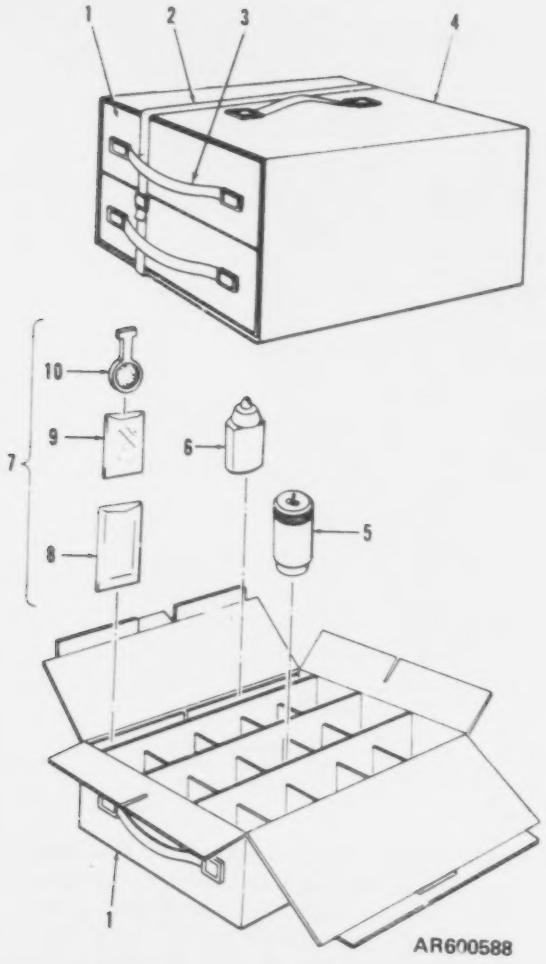
1-16. Functional Description

(fig. 1-8)

Air is drawn into the M43 detector unit through the AIR INLET (1) and passes through a temperature-controlled heater (2). The heater (2) insures that the temperature of the air sample, next applied to the air filter (3), is not below 90 °F. The air filter (3) removes foreign particles before the sample is processed in the detector cell (4). Solution is pumped from the reservoir (5) into the detector cell (4) by the pump assembly (6). The air sample combines with the solution within the detector cell (4). An electrical signal produced by the cell is monitored by the electronic module of the M43 detector unit. The air-solution mixer is pumped out of the detector cell (4) back into the reservoir (5) where the air and solution separate. Next, the pump assembly (6) draws the air from the reservoir (5) and exhausts it through the AIR OUTLET heater (7) into the atmosphere. The AIR OUTLET heater automatically heats the AIR OUTLET to prevent icing. Solution drawn from the reservoir (5) is scrubbed of impurities in the detector cell (4) as it is recirculated by the pump assembly (6). When an air sample containing chemical agent is mixed with solution, the detector cell-electrical output increases, and the electronic module turns on the horn and turns off the pump assembly. The horn will sound until the operator either resets the M43 detector unit or disconnects the power source. When the horn sounds, the electronic module also provides a trigger signal to the REMOTE binding posts (17, fig. 1-2). If an M42 alarm unit (2, fig. 1-1) is connected to the REMOTE binding posts, the M42 alarm unit also provides a warning signal.

1-17. Tabulated Data

a. Table 1-1 lists dimensions and weights of



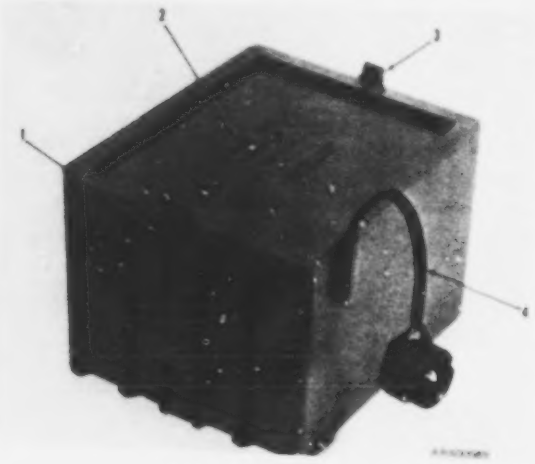
1 Drawer
2 Strap
3 Handle
4 Sleeve
5 Reservoir Assembly
6 Sensitivity check bottle
7 Air filter package
8 Watertight bag
9 Plastic wrapper
10 Air filter

Figure 1-6. M229 refill kit.

alarm system components.

b. Table 1-2 lists the maximum number of 12-hour missions that a BA3517/U battery (7, fig. 1-1) can be used or a BB501/U battery (4) can be used before recharging. The maximum number of usable missions for each battery is tabulated as a function of the average air temperature in which the battery is operated.

c. Table 1-3 is a list of authorized consumable supplies and material required for operation of the equipment.



1 Metal strap
2 Identification plate
3 Clamping catch
4 Cable assembly

Figure 1-7. BA3517/U battery.

d. Operating and performance characteristics of components are as follows:

(1) *M43 detector unit.*

Power requirements ..... 18 to 39 Vdc
Environmental operating limits
Temperature ..... -40 °F. to 120 °F.
Humidity ..... up to 100%

(2) *M42 alarm unit.*

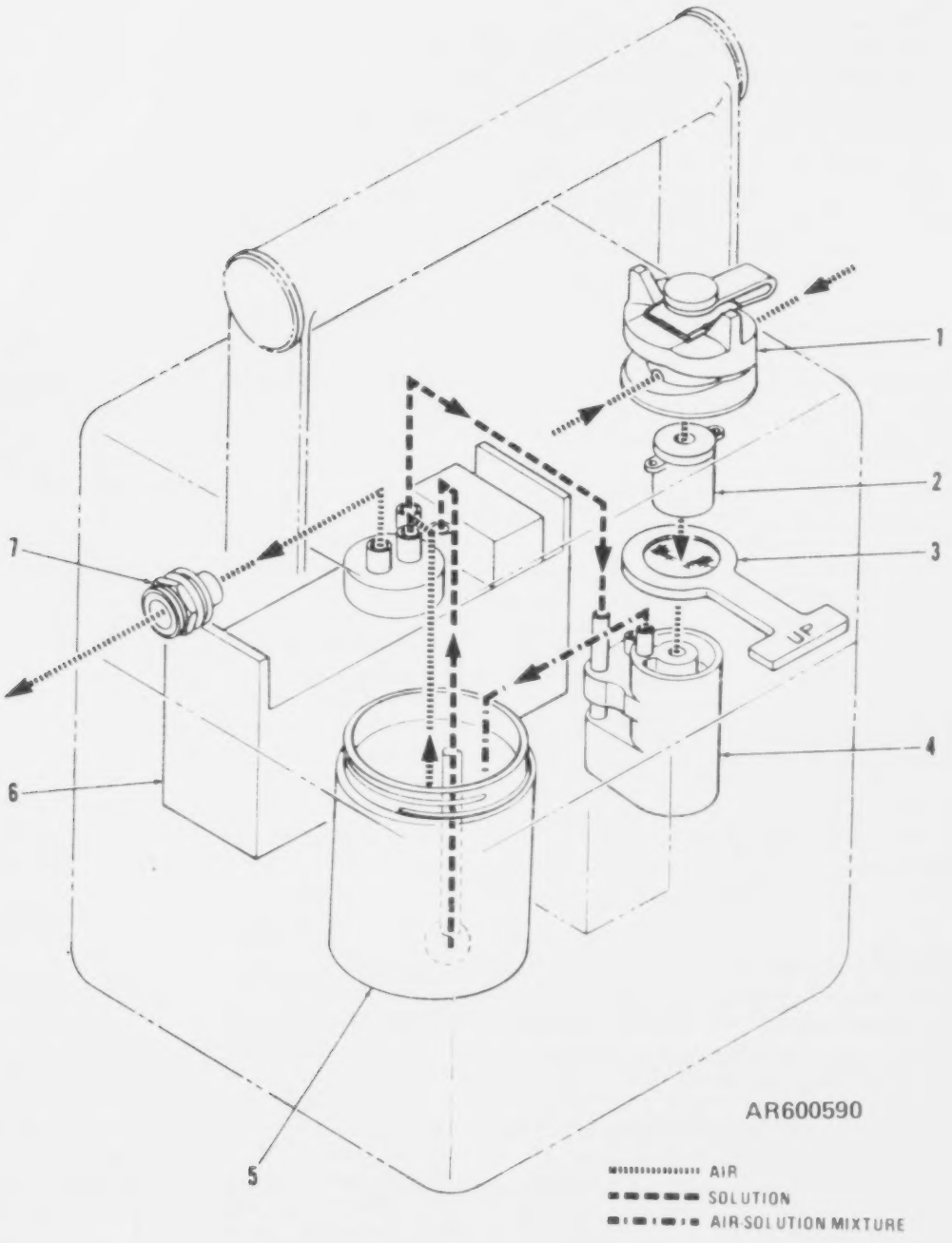
Power requirements ..... 6 Vdc
Environmental operating limits
Temperature ..... -40 °F. to 120 °F.
Humidity ..... up to 100%

(3) *M10 power supply.* Refer to TM 3-6665-261-14.

(4) *BB501/U battery.* Refer to TM 11-6140-203-15-3 (Under revision).

(5) *BA3517/U battery.*

Type ..... Manganese-alkaline
Environmental operating limits
Temperature ..... 20 °F. to 120 °F.
Humidity ..... up to 100%
Operating life ..... See table 1-2



1 AIR INLET
2 Heater
3 Air filter
4 Detector cell
5 Reservoir
6 Pump assembly
7 Heater

Figure 1-8. M43 detector unit air-solution flow diagram

Table 1-1. Dimensions and Weights

Component	Length (in.)	Width (in.)	Height (in.)	Approx Weight (lb.)
M43 detector unit (serviced)	6.3	7.7	11	6.5
M42 alarm unit with batteries	8.8	6	6	3.8
M10 power supply	12.4	6.4	7.4	18
M228 mounting kit	9	10	14	16
M182 mounting kit	13	10	9.2	15
M229 refill kit	13	10.4	9	13.8
BA3517/U battery	6.3	7.7	5	7.5
M168 cable	50	...	...	1
BB501/U battery assembly	13	6.5	7.2	28

Table 1-2. Battery Missions vs Air Temperature

Average air temperature (°F)	Maximum number of 12 hour missions	
	BB501/U battery	BA3517/U battery
120 to 90	14	10
80	12	8
70	12	8
60	10	5
50	9	3
40	8	2
32	6	1
20	5	1
10	3	Do not use
0	2	below 20 °F
-10 to -40	1	

Table 1-3. Consumable Supplies and Material

The supplies and material listed in this table are required for operation and maintenance of this equipment and are authorized to be requisitioned by CTA 50-970, Expendable Items: Common Table of Allowances.

Item	Description, Ref no., FSCM	National Stock Number
1	BATTERY, Dry, 1.5 Volts BA 3030/U (80058)	6135-00-930-0030
2	BATTERY, Dry, 36 Volts BA3517/U, MIL-B-18 (81349)	6135-00-450-3528
3	REFILL KIT, Chemical Agent, Automatic Alarm: M229 D5-15-4700 (81361)	6665-00-859-2214
4	DISTILLED WATER, Technical, 5 Gallons 6Z9250 (80063)	6810-00-356-4936
5	DISTILLED WATER, REAGENT, 1 Gallon 243 (24774)	6810-00-682-6867
6	RUBBER BAND, 1/4 lb box, size 32 (81348)	7510-00-243-3434

CHAPTER 2

OPERATING INSTRUCTIONS

Section I. CONTROLS AND INSTRUMENTS

2-1. General

This section describes the controls and instruments of the M43 detector unit, M42 alarm unit, and M10 power supply.

2-2. M43 Detector Unit

a. Controls.

(1) *Hand crank.* The hand crank (2, fig. 2-1), located on top of the M43 detector unit is used to manually prime the fluid system of the M43 detector unit. It has a storage (up) position and an operational (down) position.

(2) *AIR INLET assembly.* The AIR INLET assembly (4) is located near the lower-right-front corner of the top. When in the open position, air can be drawn into the M43 detector unit for sampling.

(3) *ZERO ADJUST knob.* The ZERO ADJUST knob (5) is located in the center-front portion of the top. The knob is used to set the M43 detector unit during preoperational and operational procedures and to reset the unit after an alert has been sounded.

(4) *HORN VOL-BATTERY TEST knob.* The HORN VOL-BATTERY TEST knob (6) is located in the center of the M43 detector unit top. When the knob is rotated, the horn output level varies from minimum (LO) to maximum (HI). Pressing in the knob connects the power source to the meter (1).

b. Instruments.

(1) *Meter.* The meter (1) is located on the top of the unit. It provides a visual indication of the power source voltage when the HORN VOL-BATTERY TEST knob (6) is pressed. Also, the meter is used when setting the ZERO ADJUST knob (5).

(2) *Horn.* The horn (3) is located in the upper-right hand corner of the M43 detector unit. The horn provides an audible signal when the detection circuits of the unit are activated.

(3) *FLOWMETER.* The FLOWMETER (3, fig. 1-3) is stored in the handle (2) of the M43 detector unit. It is used to indicate the flow rate of air drawn into the AIR INLET assembly (4, fig. 2-1).

2-3. M42 Alarm Unit

a. Control. The M42 alarm unit contains a three-position rotary selector switch (8, figt 1-5) which allows manual selection of TEST, HORN OFF, or HORN ON. To operate in the HORN OFF or HORN ON position, the M42 alarm unit must be connected to an operating M43 detector unit.

(1) *TEST position.* In the TEST position, the ALARM-RED indicator will flash and the loudspeaker will sound. This is a functional test of the M42 alarm unit.

(2) *HORN OFF position.* In this operational position, when the M43 detector unit signals an alarm, only the ALARM-RED indicator will flash.

(3) *HORN ON position.* When the M43 alarm unit signals an alarm, and the selector switch of the M42 alarm unit is in the HORN ON position, the ALARM-RED indicator will flash, and the loudspeaker will sound.

b. Instruments.

(1) *Loudspeaker.* The loudspeaker (5, fig. 1-5) is located on the panel (1). It provides an audible signal during test and operation of the alarm system.

(2) *ALARM-RED indicator.* The ALARM-RED indicator (3) is located on the panel (1). When activated during test or during operation, it flashes a visual warning.

2-4. M10 Power Supply

a. Control. The power switch (3, fig. 2-2) on the panel assembly (6) controls the application of ac power to the M10 power supply. The power switch (3) has three positions:

(1) 115V. Used for power input of 115 vac.

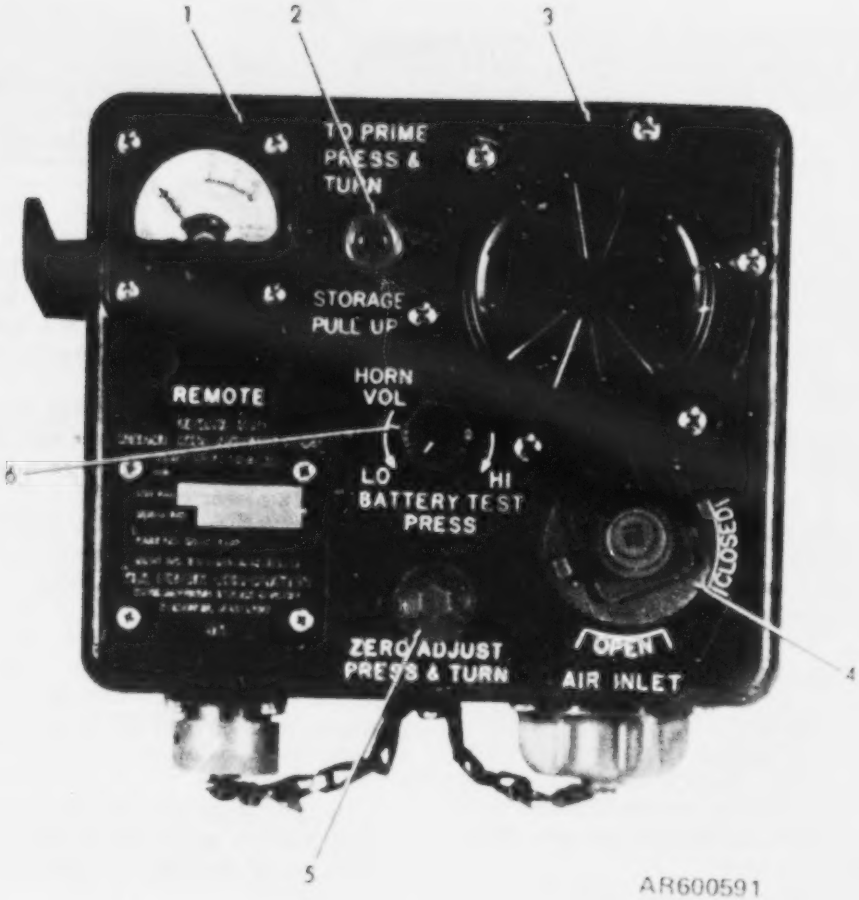
(2) OFF. Used to open input power circuit.

(3) 220V. Used for power input of 220 vac.

b. Instruments. The M10 power supply has a POWER ON indicator (2) and an annunciator (8) on its panel assembly (6).

(1) *POWER ON indicator.* The POWER ON indicator (2) lights when the M10 power supply is providing dc power.

(2) *Annunciator.* The annunciator (8) is an electrically-operated, manually-reset indicator. When the M10 power supply is operating from a 110-volt or 220-volt ac power source, the annunciator indication is all white. If a standby battery is



1 Meter
2 Hand crank
3 Horn
4 AIR INLET assembly
5 ZERO ADJUST knob
6 HORN VOL-BATTERY TEST knob

Figure 2-1. M43 detector unit controls and instruments.

connected and the ac power source is disconnected, or if the power switch (3) is positioned to OFF, the annunciator shows a black/white indication.

Section II. OPERATION UNDER USUAL CONDITIONS

2-5. General

This section contains instructions for inspecting, preparing, testing, and placing the alarm system equipment into operation under usual environmental conditions. Usual environmental conditions are defined as ambient air temperature above 40 °F., no precipitation, and no apparent presence of blowing dust or sand. For operation in temperatures below 40 °F.; in rain, sleet, or snow; or in blowing dust or sand; refer to paragraphs 2-15 through 2-17 for special instructions for operation under unusual conditions.

NOTE

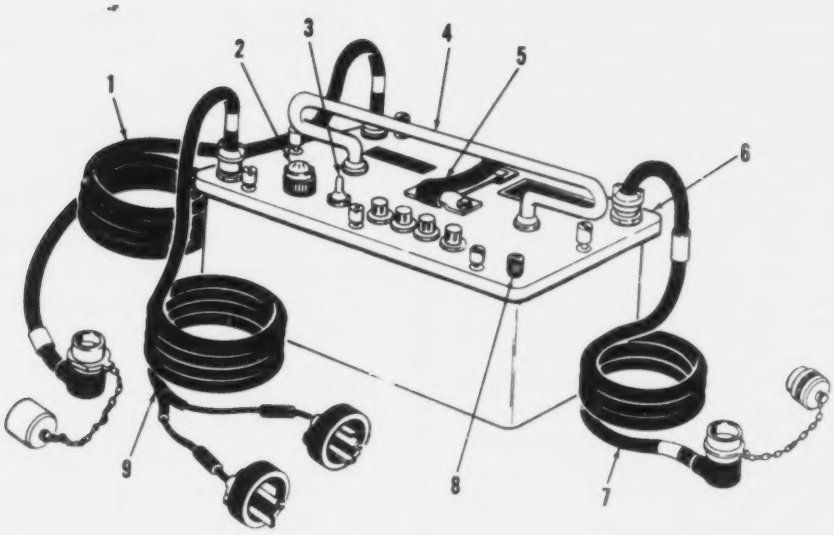
If the alarm system is to be operational for two or more continuous missions, perform checks and reservicing procedures (para 2-10) after each 12-hour mission.

2-6. Preoperational Procedures

These procedures prescribe mandatory equipment inspections prior to preparing the equipment for operation.

NOTE

Inspect exterior of M43 detector unit for cracks or breaks and loose or missing parts. Turn in a unit suspect of damage or inability to operate properly because of visible deficiencies.



1 STANDBY BATTERY cable (W3)
2 POWER ON indicator
3 Power switch
4 Handle
5 Strap
6 Panel assembly
7 DETECTOR POWER cable (W2)
8 Annunciator
9 115V/220V cable (W1)

Figure 2-2. M10 power supply.

a. M43 Detector Unit.

(1) Check that RAINSHIELD assembly (1, fig. 1-3) and FLOWMETER (3) are not damaged and are installed in handle (2).

(2) Release four clamping catches (12, fig. 1-2) and remove detector unit assembly (6) from bottom case assembly (9). Place detector unit assembly (6) on its side with AIR FILTER plug (7) up.

(3) Check that bottom case assembly contacts (2, fig. 1-4) and meeting contacts (5, fig. 1-3) on detector unit assembly are not corroded, broken, or bent.

(4) Check that detector cell (8, fig. 1-3) is securely installed.

(5) For new equipment, install detector cell as follows:

(*a*) Remove strap from bail (9).

(*b*) Remove detector cell can from handle.

(*c*) Remove detector cell from can.

(*d*) Remove plastic bag, two caps, and plug.

(*e*) Dampen outside of two detector cell ports with a few drops of water.

(*f*) Position detector cell (8) so that its ports are alined with their corresponding fittings in chassis (4). Press detector cell into place in chassis.

(*g*) Center bail (9) on the bottom of detector cell (8) and turn lobed nut clockwise until fingertight.

(6) Verify that catches (6) of pump assembly (7) are secured.

(7) Check that turnlock fastener (11) of electronic module (10) is locked in position.

(8) Install detector unit assembly (6, fig. 1-2) in bottom case assembly (9) and secure four clamping catches (12).

b. M42 Alarm Unit

NOTE

Notify personnel within audible range that test of the M42 alarm unit is to be made.

(1) Position selector switch (8, fig. 1-5) to TEST. If M42 alarm unit is operative, loudspeaker (5) will sound, and ALARM-RED indicator (3) will flash.

(2) If M42 alarm unit does not operate in TEST mode, install fresh batteries (para 3-16). Repeat (1) above.

(3) Position selector switch (8) to HORN OFF.

c. M10 Power Supply

(1) Unbuckle strap (5, fig. 2-2), unwind STANDBY BATTERY cable (W3) (1), DETECTOR POWER cable (W2) (7), and 115V/220V cable (W1) (9) from handle (4).

(2) Connect 115V/220V cable (W1) (9) to power source.

(3) Set power switch (3) to either 115V or 220V position, determined by input voltage to which M10 power supply is connected. POWER ON indicator (2) must light.

(4) Set annunciator (8) to its "all white" position by turning it fully clockwise. Then rotate annunciator full counterclockwise.

(5) Position power switch (3) to OFF.

(6) Disconnect 115V/220V cable (9) from power source.

d. M229 Refill Kit

(1) Check date on M229 refill kit sleeve (4, fig. 1-6). Discard M229 refill kit with expired date.

(2) Check that each reservoir assembly (5) is filled to above line on container. Check that liquid in reservoir assembly (5) is clear, not discolored or contaminated. Discard defective reservoir assemblies in M229 refill kit. Check that sensitivity check bottle (6) contains enough liquid for mission.

(3) Check contents of M229 refill kit to assure that enough reservoir assemblies (5) and air filters (10) are available for the mission.

e. Battery power sources

(1) *BA3517/U battery (7, fig. 1-1).* Inspect BA3517/U battery for bent or broken connector pins that could prevent proper electrical connection and frayed or broken cable assembly insulation. Inspect the case for damage, such as cracks, that could prevent proper use of battery. Replace BA3517/U battery if suspect of damage.

(2) *BB501/U battery and M168 cable (4 and 6, fig. 1-1).* Inspect and service BB501/U battery in accordance with TM 11-6140-203-15-3. Inspect M168 cable for bent or broken connector pins, frayed or broken cable assembly insulation, and other damage that could prevent proper electrical connection and use of battery. Replace discharged or defective BB501/U battery with freshly charged battery and replace M168 cable assembly if suspect of damage.

f. Mounting Kit. If a mounting kit is part of the system configuration, check that vehicular mounting components are secure. Check cables for damage (cuts, chafed insulation, exposed wires) and secure connections. Return vehicles to organizational maintenance that have loose mounting kit components and cables that are suspect of damage.

2-7. Pre-Startup Procedures

These procedures prescribe the method of preparing and installing the solution reservoir assembly and installing the air filter in the M43 detector unit.

CAUTION

Before airdrop operations, empty the liquid from the M43 detector unit reservoir assembly. Internally splashing liquid may cause the M43 detector unit to become inopeative and cause the mission to be aborted. Do not perform the following procedures until after the airdrop.

a. Remove one solution reservoir assembly (5, fig. 1-6) from drawer (1) of the M229 refill kit.

b. Prepare solution as described in figure 2-3.

c. Install Reservoir Assembly.

(1) Release four clamping catches (12, fig. 1-2) from catches (13) and remove detector unit assembly (6) from bottom case assembly (9).

WARNING

Solution in reservoir assembly is caustic. Avoid contact with eyes and mouth. Flush from skin with water.

CAUTION

Keep weight assembly (12.1, fig. 1-3) free from dirt after removing reservoir assembly.

(2) Hold detector unit assembly upright by its handle (2, fig. 1-3) and unscrew reservoir assembly (12) counterclockwise. Allow weight assembly (12.1) to hang down. Discard used reservoir assembly (12) in accordance with standing operating procedures.

(3) Remove and discard cap from prepared solution reservoir assembly.

(4) Center new reservoir assembly under weight assembly and screw reservoir assembly clockwise into mounting hole in detector assembly. Insure tight seal by turning reservoir D-ring clockwise.

NOTE

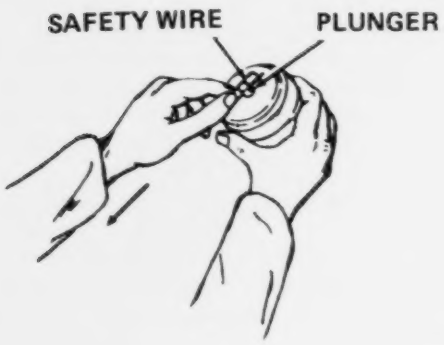
If the M43 detector unit is to be backpacked, position bottom case assembly (9, fig. 1-2) so that instruction plate (3, fig. 1-4) is on side opposite 24 VDC INPUT receptacle (11, fig. 1-2).

(5) Check that seal (1, fig. 1-4) is completely seated in groove around top of bottom case assembly. Assemble detector unit assembly (6, fig. 1-2) to bottom case assembly (9) and secure clamping catches (12).

d. Install Air Filter

NOTE

If air filter has been installed in M43 detector unit for less than 24 hours, remove one air filter package (7, fig. 1-6), disregard (1) through (5) below, and proceed to paragraph 2-8.



1. REMOVE SAFETY WIRE FROM PLUNGER.

2. TURN RESERVOIR ASSEMBLY UPSIDE DOWN AND STRIKE AGAINST HARD SURFACE UNTIL PLUNGER IS FLUSH WITH CAP.

3. SHAKE RESERVOIR ASSEMBLY FOR 1 MINUTE. SOLUTION TURNS YELLOW.

4. LOOSEN CAP. DO NOT REMOVE.

Figure 2-3. Preparing solution.

(1) If air filter has been in the M43 detector unit for 24 hours or more, or if no air filter is in place, remove two air filter packages (7) from M229 refill kit. Also remove sensitivity check bottle (6).

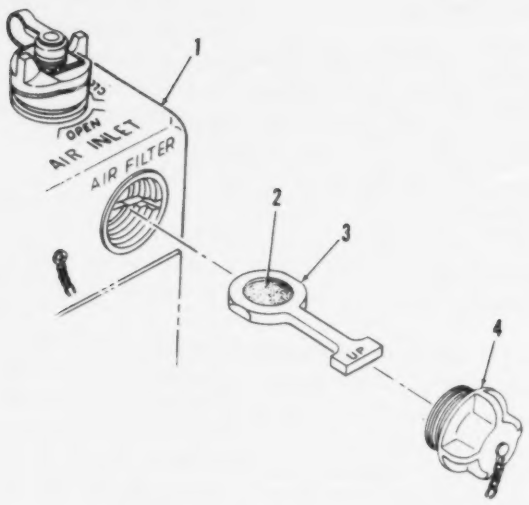
NOTE

One air filter will be used during startup (para 2-9) and one will be used during mission.

(2) Unscrew AIR FILTER plug (4, fig. 2-4). Remove and discard air filter (3) from M43 detector unit.

(3) Open and discard watertight bag (8, fig. 1-6). Remove air filter (10) from plastic wrapper (9) and discard plastic wrapper.

(4) Insert air filter (3, fig. 2-4) into AIR FILTER slot of M43 detector unit (1) with black side of filter material (2) upward.



1 M43 detector unit
2 Filter material
3 Air filter
4 Plug

Figure 2-4. Installing air filter.

(5) Install and tighten AIR FILTER plug (4).

2-8. Installing Equipment as a System

The remaining procedures require that the alarm system be installed in accordance with the appropriate instructions in paragraphs 3-1 and 3-4.

NOTE

Do not connect power to M43 detector unit 24 VDC INPUT connector (11, fig. 1-2) until instructed to do so.

2-9. Startup and Operation

These procedures start and place the alarm system into operation.

a. Remove AIR OUTLET cap (15, fig. 1-2) from AIR OUTLET port. Remove cover (10) from 24 VDC INPUT connector (11).

b. Check that AIR INLET assembly is in CLOSED position (fig. 2-5, A). Unscrew plug (1).

c. Press the ZERO ADJUST knob (5, fig. 2-1), rotate it fully clockwise, and release it.

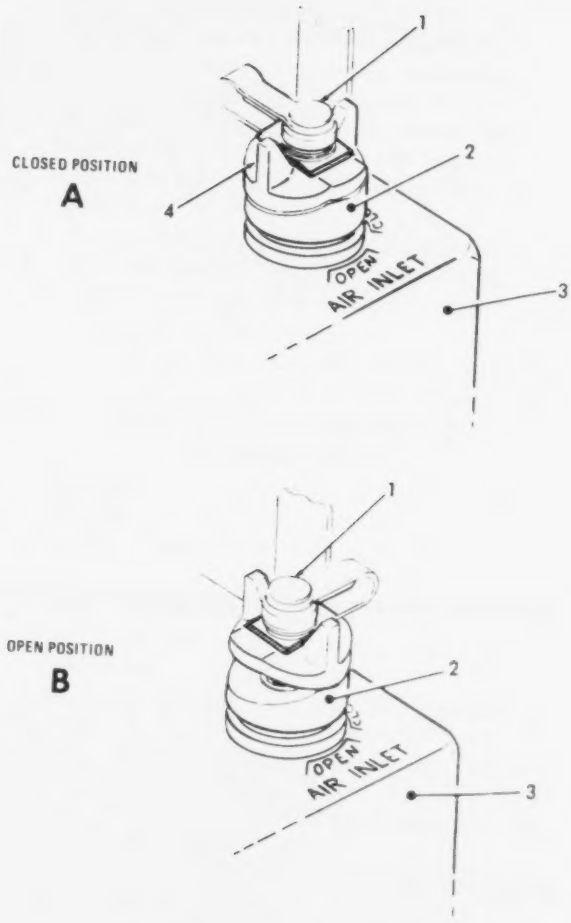
NOTE

Notify personnel within audible range that alarm system is to be tested.

NOTE

If any startup tests fail, refer to table 3-3 for operator's troubleshooting information.

d. Connect power source connector to 24 VDC INPUT connector (11, fig. 1-2) of M43 detector unit. M43 detector unit horn (2) and M42 alarm unit loudspeaker (5, fig. 1-5) must sound.



1 Plug
2 Housing
3 M43 detector unit
4 Cover

Figure 2-5. AIR INLET assembly.

e. Position M42 alarm unit selector switch (8, fig. 1-5) to HORN OFF or disconnect one wire from M43 detector unit REMOTE binding post (17, fig. 1-2). Adjust M43 detector unit HORN VOL-BATTERY TEST knob (6, fig. 2-1) for desired level.

f. Press ZERO ADJUST knob (5), rotate it fully counterclockwise, and release it. Horn must stop sounding and pump assembly must operate.

g. Press HORN VOL-BATTERY TEST knob (6). Meter (1) must indicate 24 minimum; release knob.

h. Remove FLOWMETER (3, fig. 1-3) from handle (2). Insert and twist FLOWMETER firmly clockwise into top of AIR INLET assembly

cover (4, fig. 2-6). Press down on top of FLOWMETER. Ball (6) must rise and float within correct zone for ambient temperature (fig. 2-6).

i. Press and hold ZERO ADJUST knob (5, fig. 2-1) in. Press in hand crank (2), rotate crank clockwise 50 turns, and release it.

NOTE

Keep hand crank in down position, not pressed in.

j. Press and rotate ZERO ADJUST knob (5) until meter (1) indicates in ZERO ADJUST zone (blue). Release knob. After 5 minutes, press and reset, if necessary.

NOTE

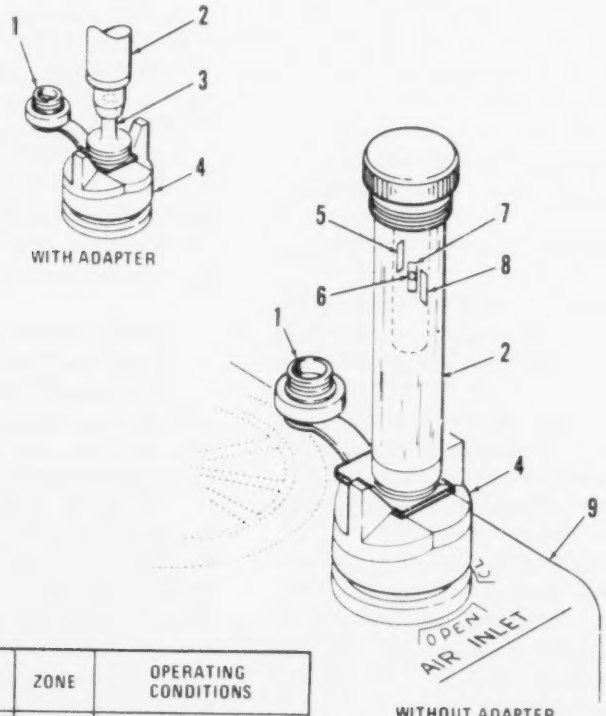
If new detector cell was installed (para 2-6*a*(5)), M43 detector unit must be allowed to operate for 1 hour to stabilize detector cell before proceeding.

k. Disconnect power source from the 24 VDC INPUT connector (11, fig. 1-2) of M43 detector unit. Position M42 alarm unit selector switch (8, fig. 1-5) to HORN ON or connect wire to M43 detector unit REMOTE binding post (17, fig. 1-5).

l. Remove protective cap from sensitivity check bottle (6, fig. 1-6). Unscrew AIR FILTER plug (4, fig. 2-4) and remove air filter (3).

m. Invert sensitivity check bottle, and, while holding dropper tip 1/2-inch over center of black side of filter material (2), allow two drops of solution to fall on filter.

n. Immediately replace air filter (3) in M43



LEGEND NO.	ZONE	OPERATING CONDITIONS
8	BLUE	-40° TO 32°F. OR 10,000 FT ALTITUDE
7	GREEN	32° TO 90°F.
5	RED	90°F. TO 130°F.

1 Plug
2 FLOWMETER
3 Adapter
4 Cover
5 Red zone
6 Ball
7 Green zone
8 Blue zone
9 M43 detector unit

Figure 2-6. FLOWMETER application.

detector unit and secure AIR FILTER plug (4). Replace cap on sensitivity check bottle and return it to M229 refill kit.

o. Connect power source to 24 VDC INPUT connector (11, fig. 1-2) of M43 detector unit.

p. Immediately press and hold ZERO ADJUST knob (5, fig. 2-1) for 5 seconds and release it. Within 15 seconds to 5 minutes, M43 detector unit horn (3) must sound, M42 alarm unit loudspeaker (5, fig. 1-5) must sound, and ALARM-RED indicator (3) must flash.

NOTE

If M43 detector unit horn does not sound, repeat j. through p. above twice, if necessary. Use a new filter each time. Then refer to table 3-3 for operator's troubleshooting information.

q. Disconnect power source connector from M43 detector unit 24 VDC INPUT connector (11, fig. 1-2).

r. Remove AIR FILTER plug (4, fig. 2-4) and discard used air filter (3). Open unused air filter package (7, fig. 1-6); discard watertight bag (8). Remove air filter (10) from plastic wrapper (9) and discard plastic wrapper.

s. Insert air filter (3, fig. 2-4) into AIR FILTER slot of M43 detector unit (1) with black side of filter material (2) upward. Install and tighten AIR FILTER plug (4).

t. Connect power source to 24 VDC INPUT connector (11, fig. 1-2).

u. Press and adjust ZERO ADJUST knob (5, fig. 2-1) so that meter (1) indication is within blue ZERO ADJUST zone. Then release knob. Repeat after 5 minutes.

v. Twist FLOWMETER (2, fig. 2-6) clockwise and remove it from AIR INLET assembly cover (4). Install FLOWMETER in M43 detector unit handle.

w. Rotate AIR INLET assembly to OPEN position (fig. 2-5, B).

CAUTION

To prevent damage by overheating, never operate M43 detector unit with AIR INLET assembly in CLOSED position and AIR INLET plug (1, fig. 2-6) installed.

x. Install and secure AIR INLET plug (1).

NOTE

The alarm system is now operational. When in operation, keep the M43 generally in an upright position. Tilt angles greater than 45° may cause improper operation.

2-10. Continuous Use–Checks and Reservicing Procedures

The following prescribes power-source checks and M43 detector unit reservicing procedures that must be performed every 12 hours when an alarm system is operating continuously.

a. If M10 power supply and standby battery are in use, perform following voltage level checks:

(1) Check voltage output of M10 power supply by pressing M43 detector unit HORN VOL-BATTERY TEST knob (6, fig. 2-1). Meter (1) must indicate 24 minimum. Position M10 power supply power switch (3, fig. 2-2) to OFF.

(2) Check voltage output of standby battery by pressing M43 detector unit HORN VOL-BATTERY TEST knob (6, fig. 2-1). Meter (1) must indicate 24 minimum. Replace discharged battery. Return discharged BB501/U battery to organizational maintenance for recharging. Discard discharged BA3517/U battery.

b. If BA3517/U battery or BB501/U battery are used as primary power sources, or if alarm system is installed in vehicle, check power source voltage output (*a*(2) above).

c. Reservice M43 detector unit as follows:

(1) Disconnect power source from 24 VDC INPUT connector (11, fig. 1-2).

(2) Remove one solution reservoir assembly (5, fig. 1-6) from drawer (1) of M229 refillkit.

(3) Prepare solution (fig. 2-3).

(4) Install reservoir assembly (para 2-7*c*).

(5) Rotate AIR INLET assembly to CLOSED position. Unscrew plug (1, fig. 2-5A).

(6) Press ZERO ADJUST knob (5, fig. 2-1), rotate it fully clockwise, and release it.

NOTE

Notify personnel within audible range that alarm system is to be tested.

(7) Connect power source connector 24 VDC INPUT connector (11, fig. 1-2) of M43 detector unit. M43 detector unit horn (2, fig. 1-2) and M42 alarm unit loudspeaker (5, fig. 1-5) must sound.

(8) Position M42 alarm unit selector switch (8, fig. 1-5) to HORN OFF or disconnect one wire from M43 detector unit REMOTE binding post (17, fig. 1-2). Adjust HORN VOL-BATTERY TEST knob (6, fig. 2-1) for desired level.

(9) Press ZERO ADJUST knob (5), rotate it fully counterclockwise, release it. Horn must stop sounding and pump must operate.

(10) Press HORN VOL-BATTERY TEST knob (6). Meter (1) must indicate 24 minimum. Release knob.

(11) Remove FLOWMETER (3, fig. 1-3) from handle (2). Insert and twist FLOWMETER firmly clockwise into top of AIR INLET assembly cover (4, fig. 2-6). Press down on top of FLOWMETER. Ball (6) must rise and float within correct zone for ambient temperature (fig. 2-6).

(12) Press and hold ZERO ADJUST knob (5, fig. 2-1) in. Press in hand crank (2), rotate crank clockwise 50 turns, and release it.

NOTE

Keep hand crank in down position, not pressed in.

(13) Press and rotate ZERO ADJUST knob until meter (1) indicates in ZERO ADJUST zone (blue). Release knob. After 5 minutes, press and reset, if necessary.

(14) Disconnect power source connector from M43 detector unit 24 VDC INPUT connector (11, fig. 1-2).

(15) Remove protective cap from sensitivity check bottle (6, fig. 1-6). Unscrew AIR FILTER plug (4, fig. 2-4)and remove air filter (3).

(16) Invert sensitivity check bottle and, while holding dropper tip 1/2 inch over center of black side of filter material (2), allow two drops of solution to fall on filter.

(17) Immediately replace air filter (3) in M43 detector unit and secure AIR FILTER plug (4). Replace cap on sensitivity check bottle.

(18) Connect power source to 24 VDC INPUT connector (11), fig 1-2) of M43 detector unit.

(19) Immediately press and hold ZERO ADJUST KNOB (5, fig. 2-1) for 5 seconds and release it. Within 15 seconds to 5 minutes, M43 detector unit horn (3) must sound.

NOTE

If M43 detector unit horn does not sound, repeat (13) through (19) above twice, if necessary. Use a new filter each time. Then refer to table 3-3 for operator's troubleshooting information.

(20) Disconnect power source connector from M43 detector unit 24 VDC INPUT connector (11, fig. 1-2).

(21) Remove AIR FILTER plug (4, fig. 2-4) and discard used air filter (3). Open unused air filter package (7, fig. 1-6), discard watertight bag (8). Remove air filter (10) from plastic wrapper (9) and discard plastic wrapper.

(22) Insert air filter (3, fig. 2-4) into AIR FILTER slot of M43 detector unit (1) with black side of filter material upward. Install and tighten AIR FILTER plug (4).

(23) Position M42 alarm unit selector switch (8, fig. 1-5) to HORN ON or connect wire to M43 detector unit REMOTE binding post (17, fig. 1-2).

(24) Connect power source connector to M43 detector unit 24 VDC INPUT connector (11, fig. 1-2).

(25) Press and adjust ZERO ADJUST knob (5, fig. 2-1) so that meter (1) indication is within blue ZERO ADJUST zone. Then release knob. Repeat after 5 minutes.

(26) Twist FLOWMETER (2, fig. 2-6) clockwise and remove it from AIR INLET assembly cover (4). Install FLOWMETER in M43 detector unit handle.

(27) Rotate AIR INLET assembly to OPEN position (fig. 2-5, B).

CAUTION

To prevent damage by overheating, never operate M43 detector unit with AIR INLET assembly in CLOSED position and AIR INLET plug (1) installed.

(28) Install and secure AIR INLET plug (1), or if M43 detector unit is mounted on a vehicle, remove RAINSHIELD assembly (1, fig. 1-3) and install and secure it in cover (4, fig. 2-6).

NOTE

The alarm system is now operational.

2-11. Operational Alert

NOTE

The M43 detector unit will signal when exposed to heavy concentrations of rocket propellant smoke, screening smoke, signaling smoke, engine exhaust, or in the event of nuclear explosion.

When the alarm system signals the presence of chemical agents, perform the following:

a. Immediately take protective measures prescribed in FM 21-41.

b. Give local alert as prescribed by local standing operating procedures (SOP).

c. Disconnect power source from M43 detector unit 24 VDC INPUT connector (11, fig. 1-2).

d. Set AIR INLET assembly cover (4, fig. 2-5) to CLOSED position (fig. 2-5, A). Remove RAINSHIELD assembly (1, fig. 1-3) from cover, if used. Install electrical connector cover (10, fig. 1-2) on 24 VDC INPUT connector (11). Install AIR OUTLET cap (15) on AIR OUTLET port of M43 detector unit.

CAUTION

Do not remove bottom case assembly (9) in presence of chemical agents. Exposure to chemical agents will render the M43 detector unit useless. Chemicals used for decontamination will damage the interior of the M43 detector unit.

e. If presence of chemical agent has been verified, decontaminate exterior of all components (TM 3-220).

2-12. Reactivating Alarm System After Operational Alert

After an all-clear has been sounded, the alarm system can be reactivated for the remainder of a 12-hour mission at the discretion of the unit commander.

NOTE

If the alarm system is to be operational for two or more continuous missions, perform checks and reservicing procedures (para 2-10) after each 12-hour mission.

a. Remove AIR OUTLET cap (15, fig. 1-2) from AIR OUTLET port.

b. Remove plug (1, fig. 2-5) from AIR INLET cover (4).

c. Remove FLOWMETER (3, fig. 1-3) from handle (2). Insert and twist FLOWMETER firmly clockwise into top of AIR INLET cover (4, fig. 2-6).

d. Remove electrical connector cover (10, fig. 1-2) from 24 VDC INPUT connector (11).

e. Connect power source connector to 24 VDC INPUT connector (11). Horn (2) must sound. Adjust HORN VOL-BATTERY TEST know (6, fig. 2-1) for desired level.

f. Press HORN VOL-BATTERY TEST knob (6). Meter (1) must indicate 24 minimum. Release knob.

g. Press ZERO ADJUST Knob (5), rotate it fully counterclockwise, and release it. Horn must stop sounding and pump assembly must operate.

h. Press down on top of FLOWMETER. Ball must float within correct zone for ambient temperature (fig. 2-6).

i. Press and rotate ZERO ADJUST knob (5) until meter (1) indicates in ZERO ADJUST zone (blue). Release ZERO ADJUST knob (5, fig. 2-1). After 5 minutes, press and reset, if necessary.

j. If meter (1) does not indicate in ZERO ADJUST zone (blue), press and hold ZERO ADJUST knob (5) in. Press in hand crank (2), rotate crank clockwise 25 turns and release it. Repeat *i* above.

k. Rotate AIR INLET assembly to OPEN position (fig. 2-5, B).

l. Twist FLOWMETER (2, fig. 2-6) clockwise and remove it from AIR INLET assembly cover (4). Install FLOWMETER in M43 detector unit handle. Install plug (1, fig. 2-5) in cover (4) or if vehicle-mounted, install RAINSHIELD assembly (1, fig. 1-3) in cover.

2-13. Shutdown Procedures

a. Shutdown For More Than 72 Hours. If alarm system is to be shutdown for more than 72 hours, return M43 detector unit and M42 alarm unit to organizational maintenance for administrative storage (para 5-3 and 5-4) or shipment (para 5-1 and 5-2).

b. Shutdown For 72 Hours or Less. If alarm system is to be shutdown for 72 hours or less and reused within 72 hours, perform following procedures:

(1) If M10 power supply is in use, set 115V/OFF/220V power switch (3, fig. 2-2) to OFF.

(2) Press HORN VOL-BATTERY TEST switch (6, fig. 2-1) on M43 detector unit and note indication of meter (1). If meter indicates less than 24, discard BA3517/U battery or forward BB501/U battery to organizational maintenance for recharging.

(3) Disconnect power source from 24 VDC INPUT connector (11, fig. 1-2).

(4) Install electrical connector cover (10) on 24 VDC INPUT connector (11).

(5) Press in M43 detector unit REMOTE binding post (17), remove telephone cable connections, and release binding posts.

(6) Release four clamping catches (12) from bottom catches (13). Remove the detector unit assembly (6) from the bottom case assembly (9).

(7) Remove reservoir assembly (12, fig. 1-3). Discard solution in accordance with standing operating procedures. Install empty resrvoir assembly to dectector unit assembly.

(8) Insure that seal (1, fig. 1-4) is correctly seated in groove around the top of bottom case assembly (9, fig. 1-2); then fasten four clamping catches (12).

(9) Set AIR INLET assembly to CLOSED POSITION (fig. 2-5, A).

(10) Pull up hand crank (2, fig. 2-1) to storage position.

(11) Install AIR OUTLET cap (15, fig. 1-2) on AIR OUTLET port.

Section III. OPERATION UNDER UNUSUAL CONDITIONS

2-14. General

This section contains instructions for operating the equipment in tropical environments, in temperatures below 40°F., in blowing sand or dust, and in raining, sleeting, or snowing environments.

NOTE

In tropical environments, inspect the M42 alarm unit batteries every 15 days for electrolyte leakage. Replace defective batteries immediately. Replace batteries installed in M42 alarm units every 30 days as a minimum.

NOTE

If the alarm system is to be operational for two or more continuous missions, perform checks and reservicing procedures (para 2-10) after each 12-hour mission.

2-15. Operation in Temperatures Below 40°F.

a. Perform preoperational procedures of paragraph 2-6.

b. Remove one air filter package (7, fig. 1-6), one sensitivity check bottle (6), and one reservoir assembly (5) from M229 refill kit. Thaw liquid in sensitivity check bottle and in reservoir assembly if frozen.

c. Install air filter (para 2-7*d*).

NOTE

When operating between 40°F. and 20°F., use either BA3517/U battery (7, fig. 1-1) or BB501/U battery (9, fig. 2-7) and M168 cable (5) as prime power source or standby battery for M10 power supply. When operating below 20°F., use only BB501/U battery and M168 cable as primary power source or standby battery for M10 power supply. Use table 1-2 as a guide for determining maximum number of missions before exchanging BA3517/U battery for a fresh battery or exchanging BB501/U battery for a freshly charged battery.

d. Install alarm system in accordance with appropriate instructions in paragraphs 3-1 through 3-4.

NOTE

Do not connect power to M43 detector unit 24 VDC INPUT connector until instructed to do so.

e. Remove AIR OUTLET cap (15, fig. 1-2) from AIR OUTLET port.

f. Remove electrical connector cover (10) from 24 VDC INPUT connector (11).

g. Check that AIR INLET assembly is in CLOSED position (fig. 2-5, A). Unscrew plug (1).

h. Press ZERO ADJUST knob (5, fig. 2-1), rotate it fully clockwise and release it. Rotate HORN VOL-BATTERY TEST knob fully clockwise.

i. Notify personnel within audible range that alarm system is to be tested.

NOTE

If any startup tests fail, refer to table 3-3 for operator's troubleshooting information.

j. Startup M43 detector unit as follows:

NOTE

In temperature below 40°F., M43 detector unit may require warmup to start pump assembly motor. Lower temperatures require longer warmup, but no longer than 50 minutes.

(1) Connect power source connector to 24 VDC INPUT connector (11, fig. 1-2). If M10 power supply is used, set power switch (3, fig. 2-2) to correct input voltage position.

(2) If M43 detector unit horn (2, fig. 1-2) sounds or pump assembly motor runs, proceed to (4) below.

(3) If horn does not sound or pump assembly does not run, M43 detector unit is in warmup mode. Do not proceed until M43 detector unit horn sounds or pump assembly motor runs. Then proceed to (4) below.

(4) Position M42 alarm unit selector switch (8, fig. 1-5) to HORN OFF, or disconnect one wire from M43 detector unit REMOTE binding post (17, fig. 1-2). Horn must be off. Disconnect power source from 24 VDC INPUT connector (11).

(5) Prepare solution as described in figure 2-3.

NOTE

To prevent the M43 detector unit from cooling off, keep bottom case assembly separated from detector assembly for as short a time as possible.

(6) Release four clamping catches (12, fig. 1-2) from bottom catches (13) and remove the detector assembly (6) from the bottom case assembly (9).

WARNING

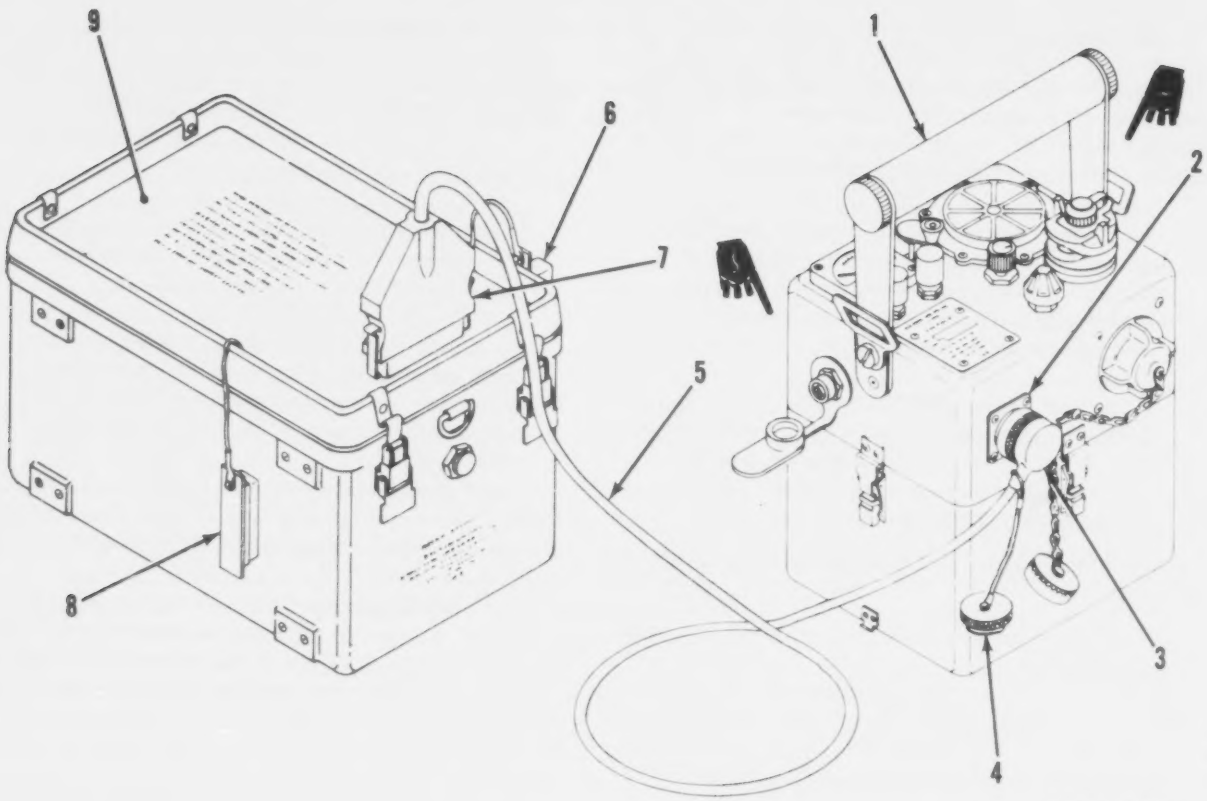
Solution in the reservoir assembly is caustic. Avoid contact with eyes and mouth. Flush from skin with water.

CAUTION

Keep weight assembly free from dirt after removing the reservoir assembly.

(7) Hold the detector assembly upright by its handle (2, fig. 1-3) and unscrew the reservoir assembly (12). Allow the weight assembly to hang down. Discard used reservoir assembly in accordance with standing operating procedures.

(8) Remove and discard cap from the pre-



1 M43 detector unit
2 24 VDC INPUT receptacle
3 Connector
4 Cap
5 M168 cable
6 Cap
7 Connector
8 Cap
9 BB501/U battery

Figure 2-7. M43 detector unit employing a BB501/U battery and M168 cable.

pared solution reservoir assembly.

(9) Center new reservoir asembly under weight assembly and screw reservoir assembly into mounting hole in detector assembly. Insure tight seal by turning reservoir assembly D-ring clockwise.

(10) Check that seal (1, fig. 1-4) is correctly seated in groove around top of bottom case assembly. Assemble detector unit assembly (6, fig. 1-2) to bottom case assembly (9) and secure clamping catches (12).

NOTE

If M43 detector unit is to be backpacked, position bottom case assembly (9, fig. 1-2) so that instruction plate (3, fig. 1-4) is on the side opposite the 24 VDC INPUT connector (11, fig. 1-2).

(11) Connect power source connector to 24 VDC INPUT connector (11, fig. 1-2). M43 detector unit horn (2, fig. 1-2) will sound in approximately 15 minutes.

(12) When horn sounds, press the ZERO ADJUST knob (5, fig. 2-1), rotate it fully counterclockwise, and release it.

(13) Press the HORN VOL-BATTERY TEST knob (6) and check that the meter (1) indicates 24 minimum.

(14) If an M10 power supply is used, set the power switch (3, fig. 2-2) to OFF. Press the HORN VOL-BATTERY TEST Knob (6, fig. 2-1) and check that the meter (1) indicates 24 minimum (standby battery voltage). Set the power switch (3, fig. 2-2) to the correct voltage position. Turn the annunciator (8) clockwise, then fully counterclockwise.

(15) Unscrew RAINSHIELD assembly (1, fig. 1-3) from handle (2). Pull rainshield (13) from adapter (14). Screw rainshield (13) into handle. Unscrew plug (1, fig. 2-6) from AIR INLET assembly cover (4). Screw adapter (2, fig. 2-8) into cover (3).

(16) Remove FLOWMETER (3, fig. 1-3) from handle (2). Insert and twist FLOWMETER firmly clockwise into top of AIR INLET assembly cover (4, fig. 2-6). Press down on top of FLOWMETER. If

flowmeter ball (6) is in the blue zone (8), proceed to (19) below. If flowmeter ball (6) indicates no airflow, proceed to (17) below. If flowmeter ball (6) indicates low airflow, proceed to (18) below.

NOTE

Adjust HORN VOL-BATTERY TEST knob (6, fig. 2-1) for low volume. Position M42 alarm unit selector switch (8, fig. 1-5) to HORN OFF or disconnect one wire from M43 detector unit REMOTE binding post (17, fig. 1-2).

(17) If no airflow is indicated, press ZERO ADJUST knob (5, fig. 2-1), rotate it fully clockwise, and release it. Horn must sound. Check airflow every 2 minutes by pressing ZERO ADJUST knob (5) and observing FLOWMETER (2, fig. 2-6). When ball (6) rises in FLOWMETER, indicating low airflow, press ZERO ADJUST knob (5, fig. 2-1) and rotate it fully counterclockwise and proceed to (18) below.

(18) If low airflow is indicated, let pump assembly operate until correct airflow (blue zone) is indicated (less than 30 minutes). Then proceed to (19) below.

(19) Press in hand crank (2, fig. 2-1) and release it.

NOTE

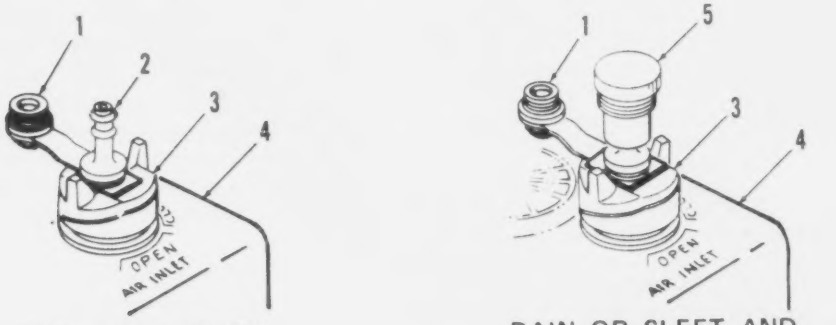
Keep hand crank in the down position, not pressed in.

(20) After 10 minutes of operation at normal airflow, press and rotate ZERO ADJUST knob (5) until meter (1) indicates in ZERO ADJUST zone (blue). Repeat at 10-minute intervals until meter reading is stable.

(21) Disconnect power source from the 24 VDC INPUT connector (11, fig. 1-2) of M43 detector unit. Position M42 alarm unit selector switch (8, fig. 1-5) to HORN ON or reconnect wire to M43 detector unit REMOTE binding post (17, fig. 1-2).

(22) Remove protective cap from the sensitivity check bottle (6, fig. 1-6). Unscrew AIR FILTER plug (4, fig. 2-4) and remove air filter (3).

(23) Invert sensitivity check bottle and, while holding dropper tip 1/2 inch over center of black side of filter material (2), allow two drops of



SNOW AND BELOW FREEZING TEMPERATURES

RAIN OR SLEET AND WHEN VEHICLE MOUNTED

1 Plug
2 Adapter
3 Cover
4 M43 detector unit
5 Rainshield

Figure 2-8. RAINSHIELD assembly application.

solution to fall on the filter.

(24) Immediately replace air filter (3) in M43 detector unit and secure AIR FILTER plug (4). Replace cap on sensitivity check bottle.

(25) Connect power source to 24 VDC INPUT connector (11, fig. 1-2) of M43 detector unit.

(26) Immediately press and hold ZERO ADJUST knob (5, fig. 2-1) for 5 seconds and release it. Within 15 seconds to 5 minutes, M43 detector unit horn (3) must sound, M42 alarm unit loudspeaker (5, fig. 1-5) must sound, and ALARM-RED indicator (3) must flash.

NOTE

If M43 detector unit horn sounds in less than 15 seconds, disconnect power source and return unit to organizational maintenance through your supervisor.

NOTE

If M43 detector unit horn does not sound, disconnect power source from 24 VDC INPUT connector, and repeat (22) through (26) above twice, if necessary. Use a new filter each time. Then refer to table 3-3 for operator's troubleshooting information.

(27) Disconenct power source connector from M43 detector unit 24 VDC INPUT connector (11, fig. 1-2).

(28) Immediately continue operation by performing the procedures of paragraph 2-9*r* through *x*.

NOTE

The alarm system is now operational.

2-16. Operation in Rain or Sleet

NOTE

After separating M43 detector unit bottom case assembly and detector assembly, position bottom case assembly with its bottom up to keep inside as dry as possible. Also shield components mounted under detector assembly with the body as much as possible.

a. Perform preoperational procedures of paragraph 2-6.

b. Remove RAINSHIELD assembly (1, fig. 1-3) from handle (2).

c. Unscrew AIR INLET assembly plug (1, fig. 2-8).

d. Screw RAINSHIELD assembly (1, fig. 1-3) into AIR INLET assembly cover (3, fig. 2-8).

NOTE

When using FLOWMETER, pull rainshield (5) away from adapter (2) and install FLOWMETER (2, fig. 2-6) over adapter (2, fig. 2-8). Screw rainshield (13) into handle (2). To remove FLOWMETER turn it clockwise and pull from adapter. Remove rainshield from handle and install over adapter.

e. If air temperature is above 40°F., perform procedures of paragraphs 2-7 through 2-9.

f. If air temperature is 40°F. or below, proceed to paragraph 2-15*b*.

2-17. Operation in Snow

a. Perform preoperational procedures of paragraph 2-6.

b. Unscrew RAINSHIELD assembly (1, fig. 1-3) from handle (2).

c. Pull rainshield (13) from adapter (14). Screw rainshield (13) into handle (2).

d. Unscrew AIR INLET assembly plug (1, fig. 2-8).

e. Screw adapter (14, fig. 1-3) into AIR INLET assembly cover (3, fig. 2-8).

NOTE

When using FLOWMETER (2, fig. 2-6), install FLOWMETER over adapter (2, fig. 2-8). When removing FLOWMETER, turn it clockwise and pull from adapter.

f. If air temperature is 40°F. or above, perform procedures of paragraphs 2-7 through 2-9.

g. If air temperature is below 40°F. proceed to paragraph 2-15*b*.

2-18. Operation in Blowing Sand or Dust

CAUTION

Do not remove bottom case assembly (9, fig. 1-2) or air filter (3, fig. 2-4) in presence of blowing sand or dust. Perform preoperational procedures (para 2-6) in a sheltered area such as inside a building, inside of a vehicle, or under a lean-to. Contamination of the components within the M43 detector unit with sand or dust will render it useless.

a. When bottom case assembly is removed, inspect for presence of sand or dust. Carefully remove any foreign material being careful not to damage components.

b. Before reassembling bottom case assembly (9, fig. 1-2) and detector unit assembly (6), wipe seal (1, fig. 1-4) and mating groove in detector assembly to insure watertight and airtight seal when they are assembled.

c. Replace air filter (3, fig. 2-4) at intervals prescribed in table 2-1 using the following procedure.

(1) Disconnect power source from 24 VDC INPUT connector.

(2) Replace air filter with a new one. Make sure the Air Filter plug is tightly installed.

(3) Reconnect power source to 24 VDC INPUT connector.

(4) Check airflow (para 2-9h).

d. If air temperature is 40°F. or above, operation is the same as under usual conditions, starting with preoperation procedures (para 2-6).

e. If air temperature is below 40°F., operation is as prescribed in paragraph 2-15.

Table 2-1. Air Filter Replacement Interval

Sand or dust concentration	Typical conditions	Air Filter replacement interval (hour)
Minimum	a. Light or medium vehicle traffic on paved surface. b. Planes taking off from clean runway. c. Infantry movement on grassy or paved surface.	12
Moderate	a. Light or medium truck traffic on sandy surface. b. Heavy tank traffic on paved surface. c. Heavy infantry movement on sandy or dusty surface.	12
High	a. Light truck traffic on dusty surface on windy day. b. Medium or heavy truck traffic on dusty surface. c. Light tank traffic on dusty surface on calm day.	6
Extreme	a. Heavy truck traffic on dusty surface on windy day. b. Light tank traffic on dusty surface on windy day. c. Medium or heavy tank traffic on dusty surface. d. Thirty feet behind half-track on dusty surface. e. Follow 1/2-ton truck on dusty surface.	2

Section IV. DAILY LOG FOR M43 DETECTOR UNIT AND PUMP ASSEMBLY

2-19. M43 Detector Unit

A modified DA Form 2408-1 (fig. 2-9), Equipment Daily or Monthly Log, is used to record daily and accumulated operating hours for the M43 detector unit (fig. 1-2). It also provides a means of determining when a pump assembly (7, fig. 1-3) must be removed and sent to direct support for scheduled maintenance (tubing replacement every 1440 hours).

a. Modification of DA Form 2408-1.

(1) Block 2. Line out "REGISTRATION OR."

(2) Block 3. Line out "OR LUBRICATION DUE."

(3) Block 4, Column b. Line out "READING" and add "DAILY."

(4) Block 4, Column c. Line out "READING MILES" and add "TOTAL HOURS."

(5) Block 4, Column i. Enter "PUMP ASSEMBLY" in first column.

b. Use of Modified DA Form 2408-1.

(1) Block 1. Enter "DETECTOR UNIT, CHEMICAL AGENT AUTOMATIC ALARM: PORTABLE, M43."

(2) Block 2. Enter serial number of the M43 detector unit.

(3) Block 3a. Not applicable.

(4) Block 3b. Enter the hours when the next pump assembly replacement is due. The hours are determined in the following manner:

(a) When putting a new M43 detector unit into service (no prior operating hours on M43 or pump assembly), enter 1440 hours in 3*b*.

(b) When changing a pump assembly in a used M43 detector unit and the pump assembly is used, determine the number of pump operating hours since last tubing replacement (from DA Form 2408-1 accompanying pump), subtract these hours from 1440, and add result to total M43 hours logged. Enter this number in 3b. Example: Total M43 detector hours on log are 1437. Pump assembly to be installed has been operated 400 hours.

1440 - 400 = 1040 hrs.

1437 + 1040 = 2477 hrs (enter in 3b).

(c) When changing a pump assembly in a used M43 detector unit and the pump assembly is new, add 1440 hours to the total M43 hours logged and enter result in 3b. Example: Total M43 detector hours on log are 1474. Pump assembly is replaced with a new pump.

1474 + 1440 = 2914 hrs (enter in 3b).

(d) When pump assembly operating hours since last tubing replacement are not known, send pump to direct support for tubing replacement.

(5) Block 3c. Not applicable.

(6) Block 4. Enter a check in the daily block.

(7) Block 4, column a. Enter date M43 is/was operating.

(8) Block 4, Column b. Enter daily operating hours.

(9) Block 4, Column c. Enter cumulative hours operated.

(10) Block 4, columns d and e. Not applicable.

(11) Block 4, Column f. Enter a check in the "IS EQUIPMENT OPERATIONAL" column if the equipment is operational. If equipment is not operational, leave the column blank and enter an "x" in the "EQUIPMENT FAULT" column.

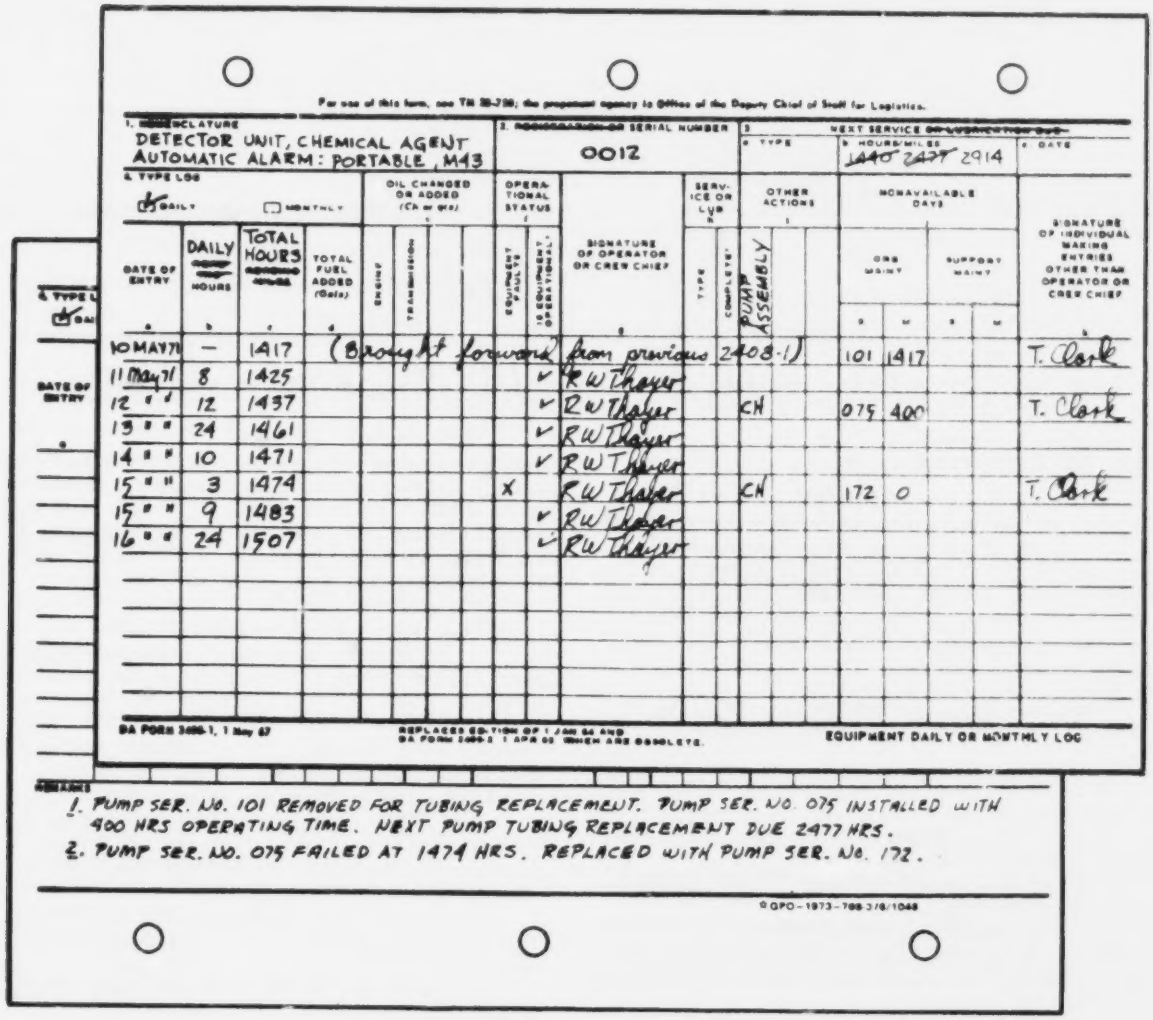
(12) Block 4, Column g. Signature of individual making entries in columns a through f.

(13) Block 4, Column h. Not applicable.

(14) Block 4, Column i. Enter "CH" when pump assembly is changed. Specify reason for change in "REMARKS" block.

(15) Block 4, Column j. Under "ORG MAINT," enter the serial number of the pump assembly in use in the "S" column. Enter the operational hours of the pump assembly since the last 1440 hour service in the "M" column. Do not use the "SUPPORT MAINT" columns. Revise block 3b.

(16) Block 4, Column k. Signature of individual making entries in columns i and j.



For use of this form, see TM 38-750; the proponent agency is Office of the Deputy Chief of Staff for Logistics.

1. NOMENCLATURE: DETECTOR UNIT, CHEMICAL AGENT AUTOMATIC ALARM: PORTABLE, M43
2. MODIFICATION OR SERIAL NUMBER: 0012
3. NEXT SERVICE OR LUBRICATION DUE: a. TYPE; b. HOURS/MILES: ~~1440~~ ~~2477~~ 2914; c. DATE
4. TYPE LOG: ☑ DAILY ☐ MONTHLY

DATE OF ENTRY	DAILY HOURS	TOTAL HOURS	TOTAL FUEL ADDED (Gals)	OIL CHANGED OR ADDED (Cks or qts): ENGINE	TRANSMISSION	OPERATIONAL STATUS: EQUIPMENT FAILURE	TO EQUIPMENT OPERATIONAL	SIGNATURE OF OPERATOR OR CREW CHIEF	SERVICE OR LUB: TYPE	COMPLETED	OTHER ACTIONS	NONAVAILABLE DAYS: ORG MAINT	SUPPORT MAINT	SIGNATURE OF INDIVIDUAL MAKING ENTRIES OTHER THAN OPERATOR OR CREW CHIEF
a	b	c	d					e			i	S	M	k
10 MAY 71	—	1417	(Brought forward from previous 2408-1)								PUMP ASSEMBLY	101	1417	T. Clark
11 May 71	8	1425					✓	RW Thayer						
12 " "	12	1437					✓	RW Thayer			CH	075	400	T. Clark
13 " "	24	1461					✓	RW Thayer						
14 " "	10	1471					✓	RW Thayer						
15 " "	3	1474				X		RW Thayer			CH	172	0	T. Clark
15 " "	9	1483					✓	RW Thayer						
16 " "	24	1507					✓	RW Thayer						

DA FORM 2408-1, 1 May 67 — REPLACED EDITIONS OF 1 JAN 64 AND DA FORM 2408-2 1 APR 63 WHICH ARE OBSOLETE. — EQUIPMENT DAILY OR MONTHLY LOG

REMARKS
1. PUMP SER. NO. 101 REMOVED FOR TUBING REPLACEMENT. PUMP SER. NO. 075 INSTALLED WITH 400 HRS OPERATING TIME. NEXT PUMP TUBING REPLACEMENT DUE 2477 HRS.
2. PUMP SER. NO. 075 FAILED AT 1474 HRS. REPLACED WITH PUMP SER. NO. 172.

☆ GPO - 1973 - 708-378/1048

AR600599

Figure 2-9. Sample DA Form 2408-1 modified for use with M43 detector unit.

2-20. Pump Assembly

A modified DA Form 2408-1 (fig. 2-10), Equipment Daily or Monthly Log, is used to record the number of pump operating hours since last tubing replacement when a pump assembly is removed from an M43 detector unit for maintenance. This form is kept with the pump assembly until it is reinstalled in an M43 detector unit and the action recorded in the M43 detector unit log. The pump assembly log is then discarded.

a. Modification of DA Form 2408-1.

(1) Block 2. Line out "REGISTRATION OR."

(2) Block 4. Line out "DAILY" and "MONTHLY" and add "SCHED. MAINT."

(3) Block 4, Column c. Line out "READING MILES" and add an asterisk (*) and "HOURS." Use another asterisk (*) to explain at bottom of form that hours entered are "operating hours since last tubing replacement."

b. Use of Modified DA Form 2408-1.

(1) Block 1. Enter "PUMP ASSEMBLY, M43 DET."

(2) Block 2. Enter pump serial number.

(3) Block 3. Not applicable.

(4) Block 4, Column a. Enter date of entry.

(5) Block 4, Column b. Not applicable.

(6) Block 4, Column c. Enter pump assembly operating hours since last tubing replacement from M43 detector unit daily log. Example: Pump assembly Serial No. 172 is removed from M43 Serial No. 0012 for maintenance. M43 total hours at time of removal is 1507 hours (see fig. 2-9); pump operating hours since last tubing replacement is 33 hours (1507-1474). Entry in column 4c of pump DA Form 2408-1 is 33 (see fig. 2-10).

(7) Block 4, Columns d through j. Not applicable.

(8) Block 4, Column k. Signature of individual making entries.

(9) Add a note to form stating "KEEP THIS FORM WITH PUMP ASSEMBLY UNTIL PUMP IS INSTALLED INTO AN M43 DETECTOR UNIT AND THE ACTION RECORDED IN M43 DETECTOR UNIT LOG." See figure 2-10.

(10) Form is now completed. Attach form to pump. Fold, wrap around pump, and secure with rubber band, item 6, table 1-3.

For use of this form, see TM 38-750; the proponent agency is Office of the Deputy Chief of Staff for Logistics.

1. NOMENCLATURE: PUMP ASSEMBLY, M43 DET.

2. ~~MODIFICATION OR~~ SERIAL NUMBER: 172

3. NEXT SERVICE OR LUBRICATION DUE — a. TYPE; b. HOURS/MILES; c. DATE

4. TYPE LOG: SCHED. MAINT.

DATE OF ENTRY	READING HOURS	* HOURS ~~READING MILES~~	TOTAL FUEL ADDED (Gals)	OIL CHANGED OR ADDED (Qts or Gals) f: ENGINE	f: TRANSMISSION	OPERATIONAL STATUS f: EQUIPMENT FAULTS	f: IS EQUIPMENT OPERATIONAL?	SIGNATURE OF OPERATOR OR CREW CHIEF	SERVICE OR LUB h: TYPE	h: COMPLETE?	OTHER ACTIONS i	NONAVAILABLE DAYS j: ORG MAINT		j: SUPPORT MAINT		SIGNATURE OF INDIVIDUAL MAKING ENTRIES OTHER THAN OPERATOR OR CREW CHIEF
a	b	c	d													b
16 MAY 7X		33														T. Clark

NOTE: KEEP THIS FORM WITH PUMP ASSEMBLY UNTIL PUMP IS INSTALLED INTO AN M43 DETECTOR UNIT AND THE ACTION RECORDED IN M43 DETECTOR UNIT LOG

* OPERATING HOURS SINCE LAST TUBING REPLACEMENT.

DA FORM 2408-1, 1 May 67 — REPLACES EDITION OF 1 JAN 64 AND DA FORM 2408-2 1 APR 62 WHICH ARE OBSOLETE. — EQUIPMENT DAILY OR MONTHLY LOG

AR601822

Figure 2-10. Sample DA Form 2408-1 modified for use with pump assembly.

CHAPTER 3

OPERATOR'S MAINTENANCE INSTRUCTIONS

Section I. INSTALLATION

3-1. General

The operator is authorized to install the M43 detector unit, M42 alarm unit, M229 refill kit, M10 power supply, and batteries. Prior to installing an item, the operator must inspect not only the item, but the equipment in which it is to be installed.

3-2. Fixed Emplacement Installation

Operator's installation procedures at fixed emplacement entail connecting the M43 detector unit to a power source and to one or more M42 alarm units.

a. M43 Detector Unit Employing BA3517/U Battery. The number of missions that a BA3517/U battery can be used is determined by the air temperature in which it is required to operate. Refer to table 1-2 to determine the maximum number of allowable 12-hour missions for a BA3517/U battery in a specific temperature.

(1) Perform applicable preoperation procedures (para 2-6) and pre-startup procedures (para 2-7).

(2) Attach BA3517/U battery (2, fig. 3-1) to bottom of M43 detector unit (1) by inserting catch (5) into slot in metal strap (4).

(3) Insert clamping catch (3, fig. 1-7) onto other catch striker on the opposite side of M43 detector unit and lock.

(4) Perform startup and operation procedures (para 2-9).

b. M43 Detector Unit Employing M253 Winterization Kit. An M253 winterization kit, consisting of two BB501/U batteries and one M168 cable, is used to supply battery power when the M43 detector unit is used in temperatures between 20°F. and -40°F. Refer to table 1-2 to determine the maximum number of allowable continuous 12-hour missions for a BB501/U battery before recharging.

(1) Perform preoperation procedures (para 2-6) and pre-startup procedures (para 2-7).

(2) Turn protective cap (4, fig. 2-7) counterclockwise and pull it from connector (3) of M168 cable (5).

(3) Pull protective cap (6) from connector (7) of M168 cable.

(4) Remove protective cap (8) of BB501/U battery receptacle.

(5) Plug connector (7) of M168 cable into receptable on top of BB501/U battery (9) after squeezing two spring clips on sides of connector (7).

(6) With keyways alined, firmly push connector (7) onto battery receptacle and release spring clips to lock connector in place.

(7) Perform setup and operation procedures (para 2-9).

c. M43 Detector Unit Employing M10 Power Supply. The fixed emplacement arrangement (fig. 3-2) of the alarm system uses an M10 power supply (1) as a power source. The M10 power supply requires an input voltage of 115 or 220 volts at a frequency of 50, 60, or 400 hertz. A standby battery (either the BA3517/U or the BB501/U employed with the M43 detector unit) is connected to the M10 power supply to automatically provide power to the M43 detector unit in the event of a power failure. If the M10 power supply output voltage decreases to less than 18 volts, a relay in the M10 power supply connects standby battery power to the M43 detector unit.

(1) Be sure that applicable preoperation procedures (para 2-6) and pre-startup procedures (para 2-7) have been performed.

NOTE

Make sure that M10 power supply power switch (3, fig. 2-2) is in OFF position.

(2) Connect DETECTOR POWER cable (W2) (3, fig. 3-2) to M43 detector unit 24 VDC INPUT connector (2).

(3) Connect STANDBY BATTERY cable (4) to BA3517/U battery or to M168 cable which is connected to BB501/U battery.

NOTE

Refer to table 1-2 to determine which battery is to be used as power source.

(4) Place M10 power supply power switch (3, fig. 2-2) to proper input voltage position.

(5) Rotate annunciator (8) fully clockwise and then fully counterclockwise.

(6) Press M43 detector unit HORN VOL-

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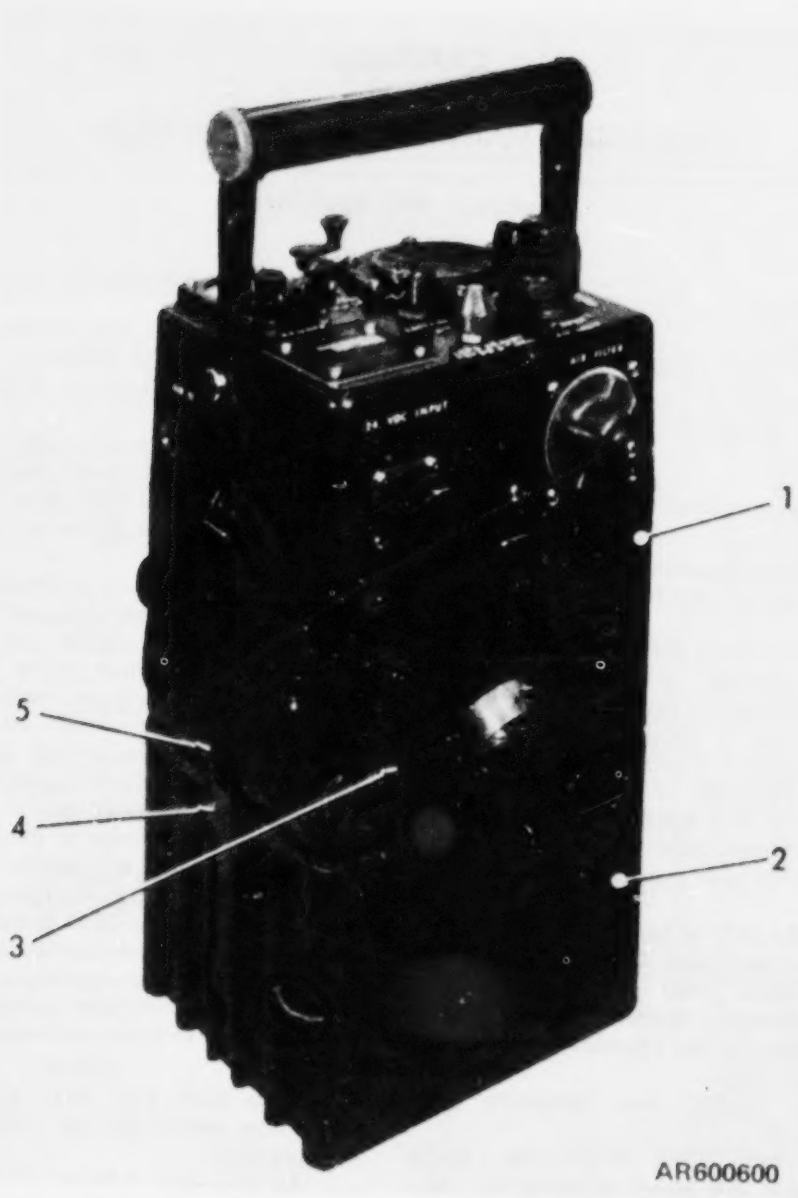


1 M43 detector unit
2 BA3517/U battery
3 Cable assembly
4 Metal strap
5 Catch

Figure 3-1. M43 detector unit employing a BA3517/U battery.

BATTERY TEST knob (6, fig. 2-1) to check that output voltage of M10 power supply is 24 volts minimum as indicated on M43 detector unit meter (1).

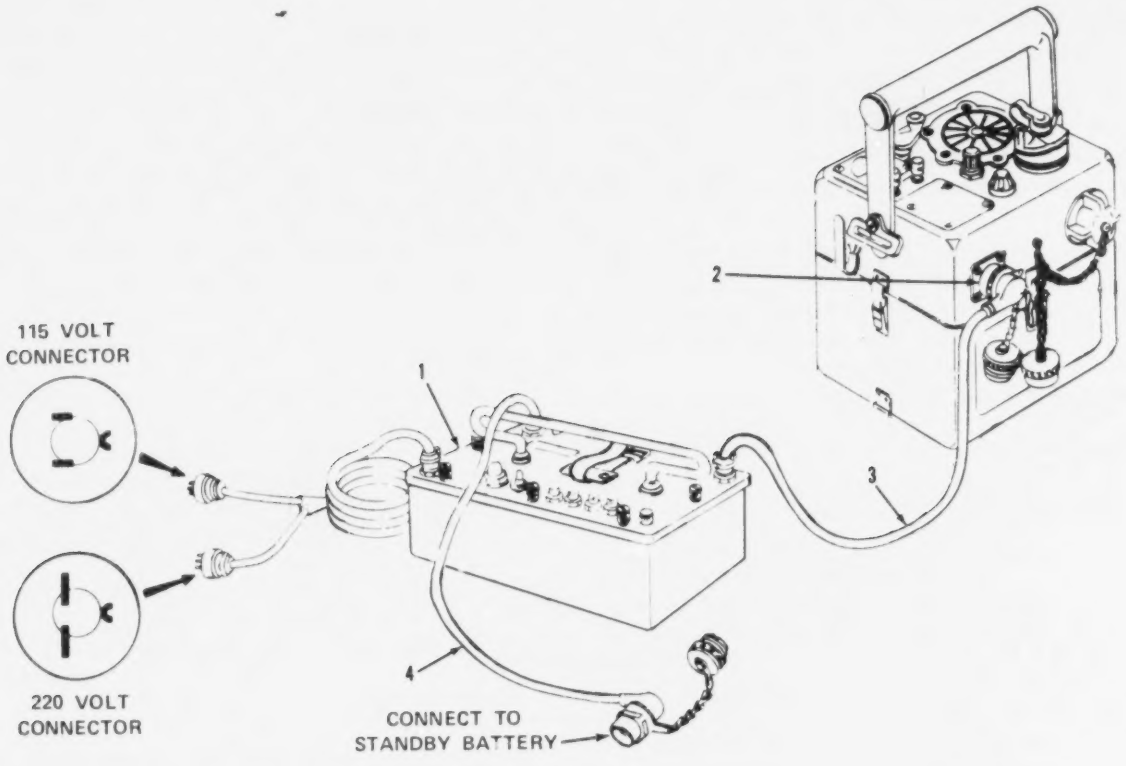
(7) Position M10 power supply power switch (3, fig. 2-2) to OFF.

(8) Press M43 detector unit HORN VOL-BATTERY TEST knob (6, fig. 2-1) to check that output voltage of standby battery is 24 volts minimum as indicated on M43 detector unit meter (1).

(9) Place M10 power supply power switch (3, fig. 2-2) to the proper input voltage position.

(10) Rotate annunciator (8) fully clockwise and fully counterclockwise to reset it.

(11) Perform startup and operation procedures (2-9).



1 M10 power supply
2 24 VDC INPUT connector
3 DETECTOR POWER cable (W2)
4 STANDBY BATTERY cable (W3)

Figure 3-2. M43 detector unit employing an M10 power supply.

d. M43 Detector Unit Employing M42 Alarm Unit(s). A fixed emplacement arrangement of one M43 detector unit employing one to five M42 alarm units (fig. 3-3) permits the M43 detector unit to be remoted from an upwind location.

NOTE

Do not connect more than one M43 detector unit in a system.

Two-wire telephone cable is used to connect each M42 alarm unit to an M43 detector unit. The M42 alarm units are placed at or close to monitoring positions.

The M43 detector unit and its power source are placed up to 400 meters upwind. When more than one M42 alarm unit is connected to an M43 detector unit, the warning can be monitored at several positions.

(1) Perform applicable preoperation procedures (para 2-6) and pre-startup procedures (para 2-7).

(2) Using figure 3-3 as a guide for various methods of connecting M42 alarm units to an M43 detector unit, position the M42 alarm units with relation to M43 detector unit so that telephone cable (5) lengths will not exceed distances specified.

(3) String telephone cable between M43 detector unit (2) and each M42 alarm unit (1) allowing approximately 1 foot of slack at end of each wire.

(4) Tie each telephone cable wire to D-ring (7) on its associated M42 alarm unit about 9 inches from end of each telephone cable wire.

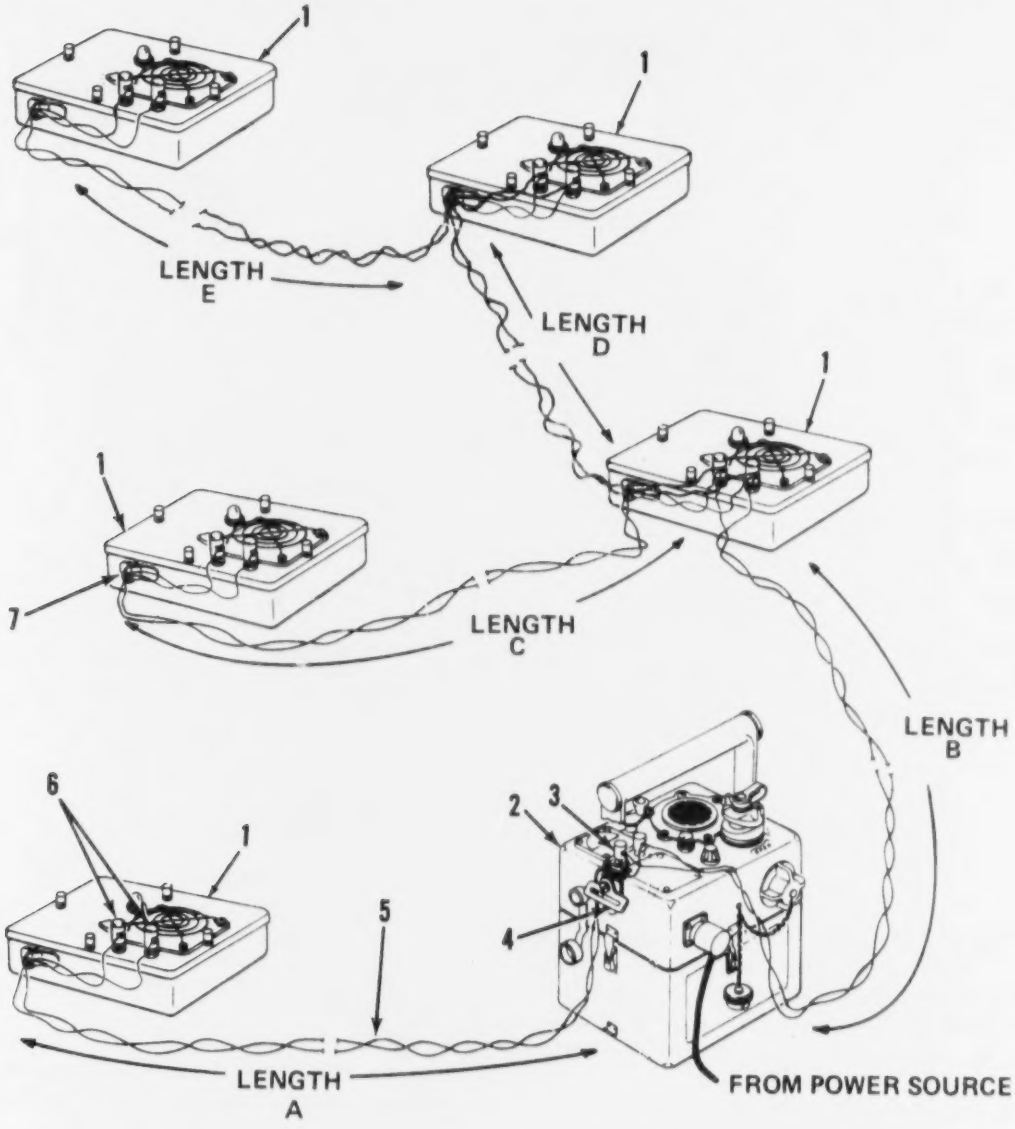
(5) Strip about one-half-inch of insulation from end of each wire.

(6) Without regard to polarity, connect a wire to each binding post (6) on M42 alarm unit.

(7) Repeat (4) through (6) above for each M42 alarm unit used.

(8) Strip about one-half-inch of insulation from the ends of the telephone cable wires to be connected to the M43 detector unit.

(9) Tie each wire to loop (4) on M43 detector unit about 9 inches from end of telephone cable.



NOTES

1. LENGTH A MUST NOT EXCEED 400 METERS.
2. LENGTH B + LENGTH C MUST NOT EXCEED 400 METERS.
3. LENGTH B + LENGTH D + LENGTH E MUST NOT EXCEED 400 METERS.

(400 METERS = 437.6 YARDS)

1	M42 alarm unit	5	Telephone cable
2	M43 detector unit	6	Binding post
3	Binding post	7	D-ring
4	Loop		

Figure 3-3. M43 detector unit employing M42 alarm unit(s).

(10) Press in one binding post (3) of M43 detector unit and, disregarding polarity, insert one wire of each telephone cable into binding post slot. Release binding post.

(11) Repeat (10) above for other binding post and remaining wires.

(12) Perform startup and operation procedures (para 2-9).

3-3. Handcarry and Backpack Systems

a. Handycarrying the M43 Detector Unit. The M43 detector unit when handcarried on an operational mission uses a BA3517/U battery for a power source. The BA3517/U battery is secured to the M43 detector unit allowing both units to be transported by the handle of the M43 detector unit. The M42 alarm unit supplied with the handcarry configuration permits the system to be used as a fixed emplacement installation with one remotely-located M42 alarm unit.

(1) Perform procedures of paragraph 3-2*a* (1) through (3).

(2) If M42 alarm unit is to be used, perform procedures of paragraph 3-2*d* (3) through (6) and (8) through (10).

(3) Perform startup and operation procedures (para 2-9).

b. Backpacking the M43 Detector Unit. The M43 detector when operated in the backpack configuration uses a BA3517/U battery for a power source. The M43 detector unit and BA3517/U battery are secured to a rucksack with a cargo shelf. The M42 alarm unit supplied with the backpack configuration permits the system to be used as a fixed emplacement installation with one remote-located M42 alarm unit.

(1) Perform applicable preoperation procedures (para 2-6) and pre-startup procedure (para 2-7).

(2) Position cargo shelf (4, fig. 3-4) on the rucksack (2).

(3) Pass short web strap (1) around top and middle bars of rucksack so that strap is centered between right and left sides of rucksack. The buckle of short web strap must be on load side of rucksack and not more than 4 inches from middle bar. Insert plain end of short web strap through buckle. Tighten short web strap as taut as possible.

(4) Tie one end of a long web strap (3) to right end of middle bar of rucksack using a non-slip knot.

(5) Tie one end of other long web strap to left end of middle bar of rucksack using a non-slip knot.

(6) Pass free ends of long web straps through adjacent outer slots of cargo shelf (4).

(7) Pull cargo shelf into horizontal position.

(8) Perform procedures of para 2-9*a* through *q*.

(9) Place rucksack in an upright position.

(10) Position M43 detector unit (1, fig. 3-5) with attached BA3517/U battery (2) on cargo shelf (3) so that AIR FILTER plug (4, fig. 2-4) is facing away from frame of rucksack (5, fig. 3-5).

CAUTION

Do not block AIR OUTLET.

(11) Tie long web strap (4) to right end of middle bar of rucksack (5). Pass strap across M43 detector unit and attached battery. Turn strap fastener loop (6) upward on left side of M43 detector unit. Insert long web strap through loop. Pull it until tight.

(12) Pass free end of long web strap around top bar, through slot, and pull it tight. Tie free end in overhand knot while maintaining tension.

CAUTION

Do not block AIR OUTLET.

(13) Pass long web strap (4) which is tied to left end of middle bar of rucksack across M43 detector unit and battery. Insert this long web strap through strap fastener loop (6) on right side of M43 detector unit. Keep the long web strap flat and pull it downward until tight. Then pass its free end around itself and pull it tight.

(14) Tighten straps to insure that M43 detector unit and BA3517/U battery are securely fastened to rucksack.

(15) Perform the procedures of paragraph 2-9*r* through *x*.

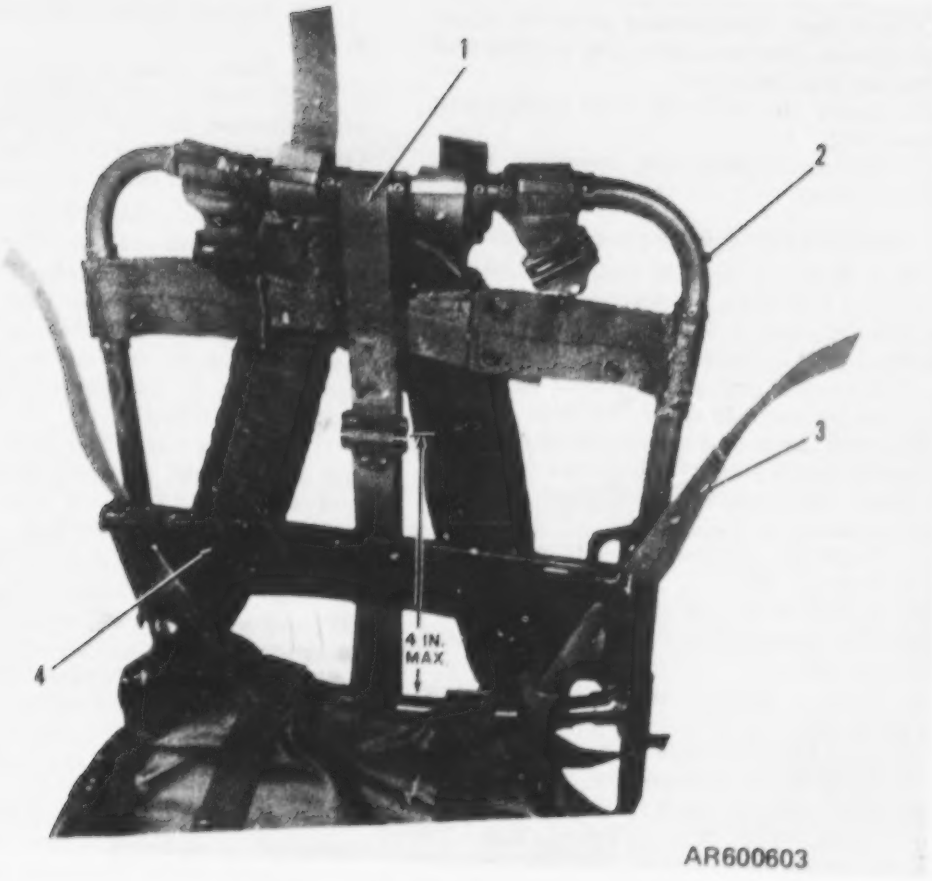
3-4. Vehicular System Installations

Vehicular system installations provide accommodations for an M43 detector unit, and M42 alarm unit, and a BA3517/U battery. Primary power to operate the equipment is supplied by the vehicle's electrical system. The BA3517/U battery provides power when the M43 detector unit is removed from the vehicle and handcarried.

a. General.

(1) The M11 alarm system is installed on a one-quarter-ton utility truck (fig. 3-6). The M43 detector unit is installed and connected to a high profile mount on the right-front fender of the vehicle. The M42 alarm unit is installed on the dash panel.

(2) The M12 alarm system is installed on a three-quarter-ton truck (fig. 3-7). The M43 detector unit is installed and connected to a high profile mount on the right-front fender of the vehicle. The M42 alarm unit is installed on the right scuff plate in the cab, and a drawer of refill kit components is secured to the upright below



1 Strap
2 Rucksack
3 Strap
4 Cargo shelf

Figure 3-4. Preparing rucksack for backpacking.

the passenger's seat cushion.

(3) The M13 alarm system is installed on a 2 1/2-ton truck (fig. 3-8). The M43 detector unit is installed and connected to a high profile mount on the rear of the left-front fender. The M42 alarm unit is installed on the cab wall in back of the companion seat.

(4) The M14 alarm system is installed on a full-tracked personnel carrier and recovery vehicle (fig. 3-9). The M43 detector unit is installed and connected to a low profile mount on the hull right nose plate. The M42 alarm unit and BA3517/U battery are mounted on a common bracket secured to the right rear corner of the hull top plate. Refill kit components are secured in a bracket mounted on the battery box on the right sponson.

(5) The M15 alarm system is installed in an armored command and reconnaissance vehicle (fig. 3-10). The M43 detector unit is installed and connected to a low profile mount on the right front slope panel. The M42 alarm unit is installed on the left front slope plate inside of the vehicle under the left periscope. Refill kit components are secured to the right sponson.

b. Installing an M43 Detector Unit and a BA3517/U Battery in a High Profile Mount (Part of M228 Mounting Kit).

(1) Perform preoperation procedures (para 2-6*a*) and pre-startup procedures (para 2-7).

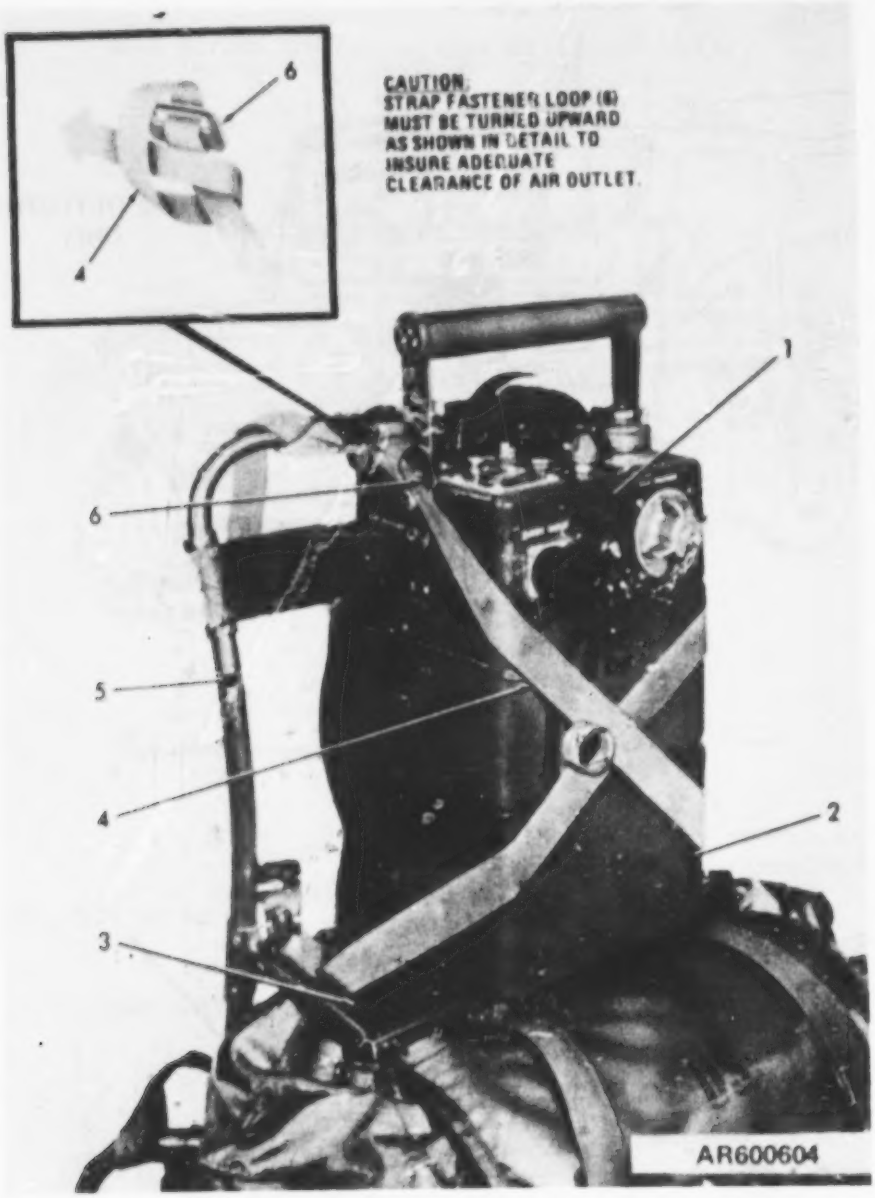
(2) Connect BA3517/U battery to the M43 detector unit as described in paragraph 3-2*a* (1) through (3).

(3) Loosen two wingnuts (1, fig. 3-11) by turning them counterclockwise.

(4) Pivot swing clamp (2) forward and down.

(5) Insure that shelf is secured in vertical position by two spring tension clips.

(6) Position M43 detector unit and attached BA3517/U battery on high profile mount as



1	M43 detector unit	4	Strap
2	BA3517/U battery	5	Rucksack
3	Cargo shelf	6	Loop

Figure 3-5. M43 detector unit and BA3517/U battery installed on a rucksack.

shown in figure 3-11.

(7) Rotate swing clamp (2) until it is positioned on top edge of M43 detector unit front panel. Tighten wingnuts (1).

NOTE

Do not connect cable assembly connector (5) to 24 VDC INPUT connector (6) until so instructed.

(8) Disconnect cable assembly connector (5) from dummy connector (4) and connect battery cable assembly (3) to dummy receptacle (4).

(9) Install M42 alarm unit in vehicle (*d*, *e*, or *f* below).

(10) Perform startup and operation procedures (para 2-9) to place equipment into operation.

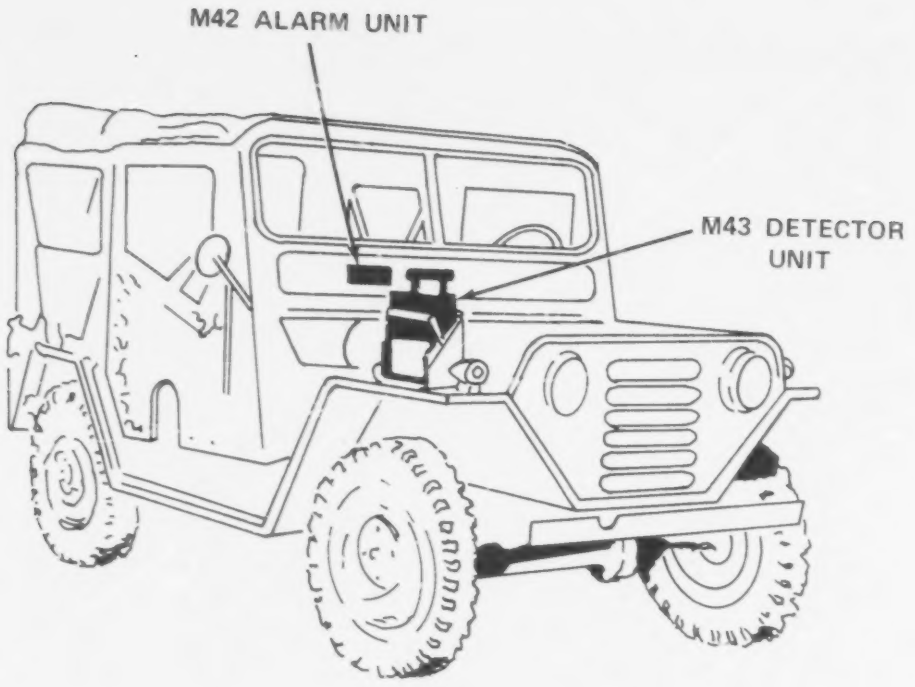


Figure 3-6. M11 alarm system installed in a one-quarter-ton utility truck.

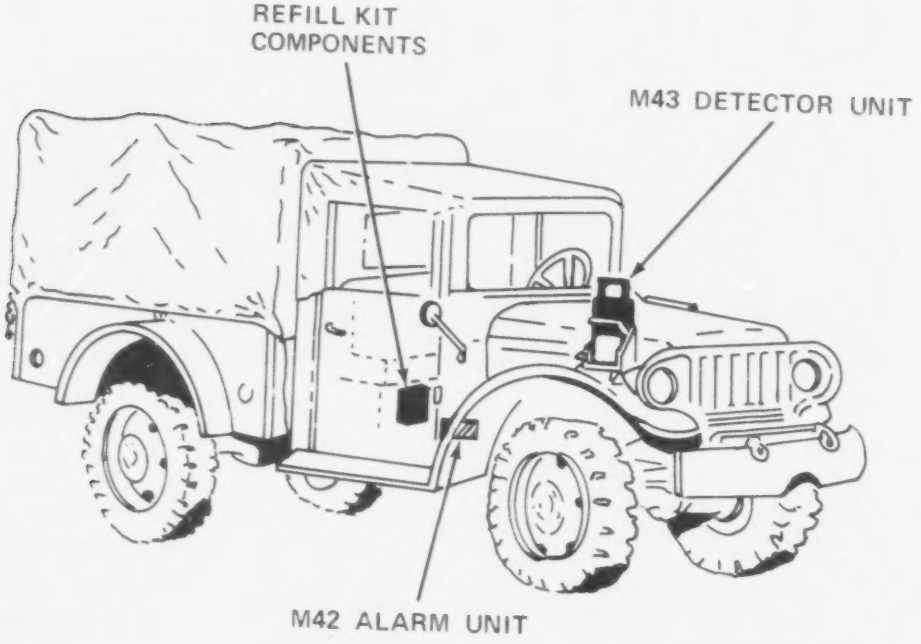


Figure 3-7. M12 alarm system installed in a three-quarter-ton truck.

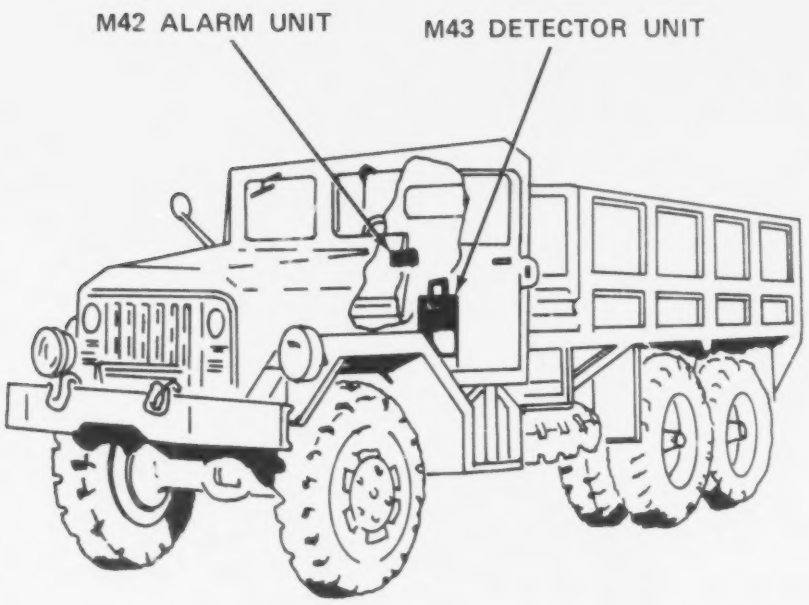


Figure 3-8. M13 alarm system installed in a 2 1/2-ton truck.

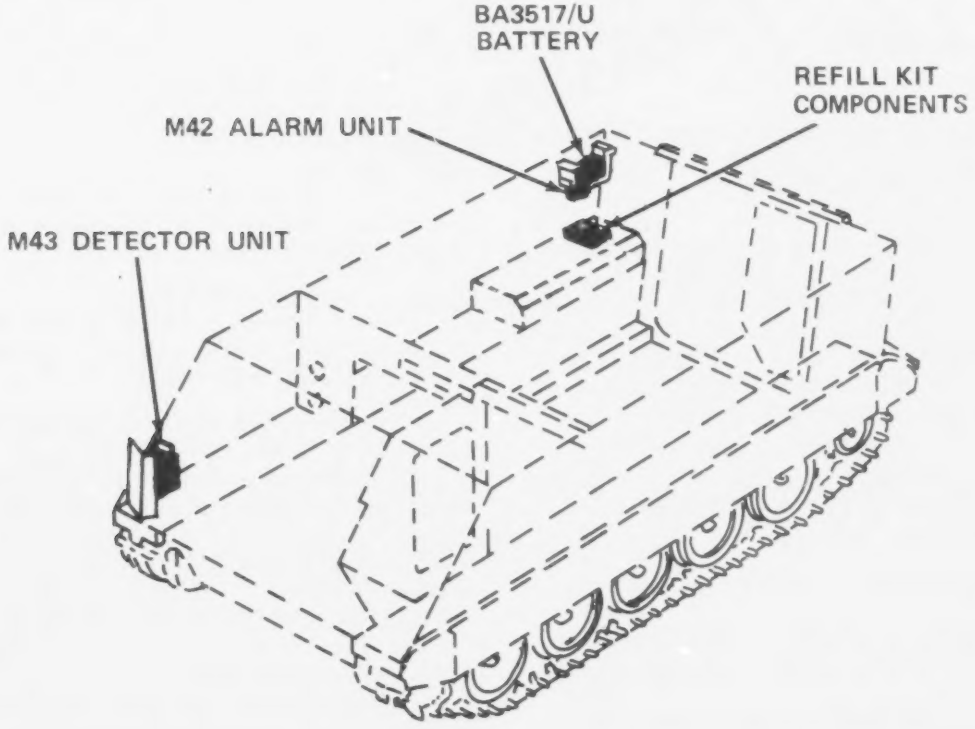


Figure 3-9. M14 alarm system installed in a full-tracked personnel carrier and recovery vehicle.

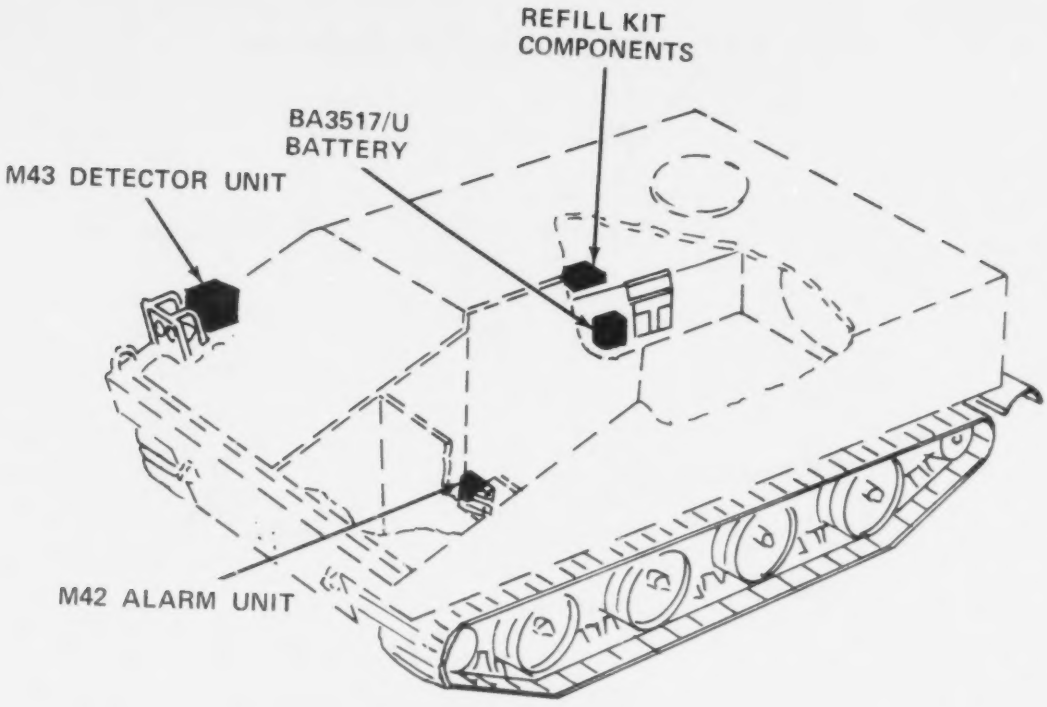


Figure 3-10. M15 alarm system installed in an armored command and reconnaissance carrier.

c. Installing an M43 Detector Unit Without a Battery in a High Profile Mount (Part of M228 Mounting Kit).

(1) Perform preoperation procedures (para 2-6) and pre-startup procedures (para 2-7).

(2) Loosen two wingnuts (1, fig. 3-12) by turning them counterclockwise.

(3) Pivot swing clamp (2) forward and down.

(4) Lower shelf (4) to horizontal position.

(5) Position M43 detector unit on shelf of M228 high profile mount as shown in figure 3-12.

(6) Rotate swing clamp (2) until it is positioned on top edge of M43 detector unit front panel. Tighten wingnuts (1).

NOTE

Do not connect cable assembly connector (3) to 24 VDC INPUT connector (5) until so instructed.

(7) Install M42 alarm unit in vehicle (*d*, *e*, or *f* below).

(8) Perform startup and operation procedures (para 2-9) to place equipment in operation.

d. Installing an M43 Detector in a Low Profile Mount (Part of M182 Mounting Kit).

(1) Perform preoperation procedures (para 2-6*a*) and pre-startup procedure (para 2-7).

(2) Loosen two wingnuts (1, fig. 3-13) by turning them counterclockwise.

(3) Pivot swing clamp (2) forward and down.

(4) Position the M43 detector unit on low profile mount.

(5) Rotate swing clamp (2) until it is positioned on top edge of M43 detector unit front panel. Tighten wingnuts (1).

NOTE

Do not connect cable assembly connector (3) to 24 VDC INPUT connector (4) until so instructed.

(6) Install M42 alarm in vehicle (*g* or *h* below).

(7) Perform startup and operation procedures (para 2-9) to place equipment in operation.

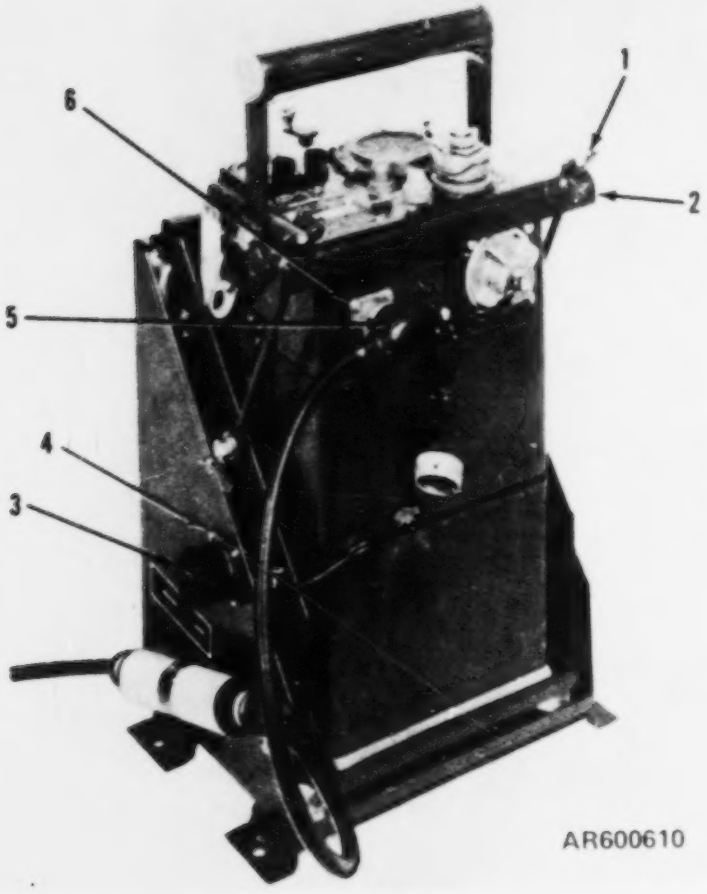
e. Installing an M42 Alarm Unit in a 1/4-Ton Utility Truck.

(1) Perform procedures of paragraph 2-6*b*.

(2) Position M42 alarm unit in bracket (2, fig. 3-14) on dash panel (1).

(3) Install latch lamping catches (3) over knurled screws (4) on M42 alarm unit.

(4) Remove protective tape from ends of cable harness wires (5) and connect wires to binding posts (6).



1 Wingnut
2 Clamp
3 Cable assembly
4 Dummy connector
5 Connector
6 24 VDC INPUT connector

Figure 3-11. M43 detector unit and BA3517/U battery installed in high profile mount.

(5) Position selector switch (7) to HORN ON.

(6) Perform startup and operation procedures (para 2-9) to place equipment in operation.

f. Installing an M42 Alarm Unit and Refill Kit Components in a 3/4-Ton Truck.

(1) Perform procedures of paragraph 2-6*b*.

(2) Position M42 alarm unit in bracket (2, fig. 3-15) on right scuff plate (1) in vehicle cab.

(3) Install latch clamping catches (3) over knurled screws (4) on M42 alarm unit.

(4) Remove protective tape from ends of cable harness wires (5) and connect wires to binding posts (6).

(5) Position selector switch (7) to HORN ON.

(6) Remove drawer from M229 refill kit and position refill kit drawer (4, fig. 3-16) on upright below passenger's cushion (1).

(7) Release strap catches (2) and secure refill kit drawer (4) with straps (3).

(8) Perform startup and operation procedures (para 2-9) to place equipment in operation.

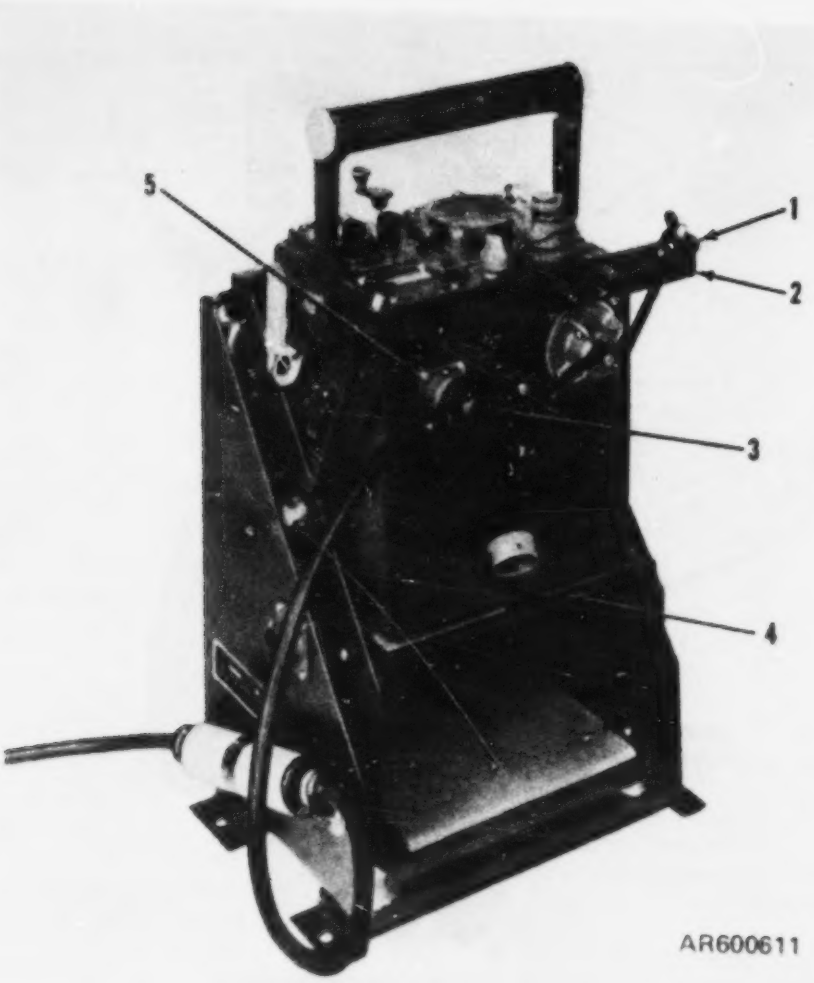
g. Installing an M42 Alarm Unit in a 2 1/2-Ton Truck.

(1) Perform procedures of paragraph 2-6*b*.

(2) Lower the back of companion seat in vehicle cab.

(3) Position M42 alarm unit in bracket (1, fig. 3-17).

(4) Install and latch clamping catches (2) over knurled screws (3) on M42 alarm unit.



1 Wingnut
2 Clamp
3 Connector
4 Shelf
5 24 VDC INPUT connector

Figure 3-12. M43 detector unit installed in high profile mount.

(5) Remove protective tape from ends of cable harness wires (4) and connect wires to binding posts (5).

(6) Position selector switch (6) to HORN ON.

(7) Perform startup and operation procedures (para 2-9) to place equipment in operation.

h. Installing an M42 Alarm Unit, Refill Kit Components, and a BA3517/U Battery in an Armored Personnel Carrier and Recovery Vehicle.

(1) Perform procedures of paragraph 2-6*b*.

(2) Position M42 alarm unit (3, fig. 3-18) in bracket (6).

(3) Install and latch clamping catches (8) over knurled screws (7) on M42 alarm unit.

(4) Remove protective tape from ends of cable harness wires (1) and connect wires to binding posts (2).

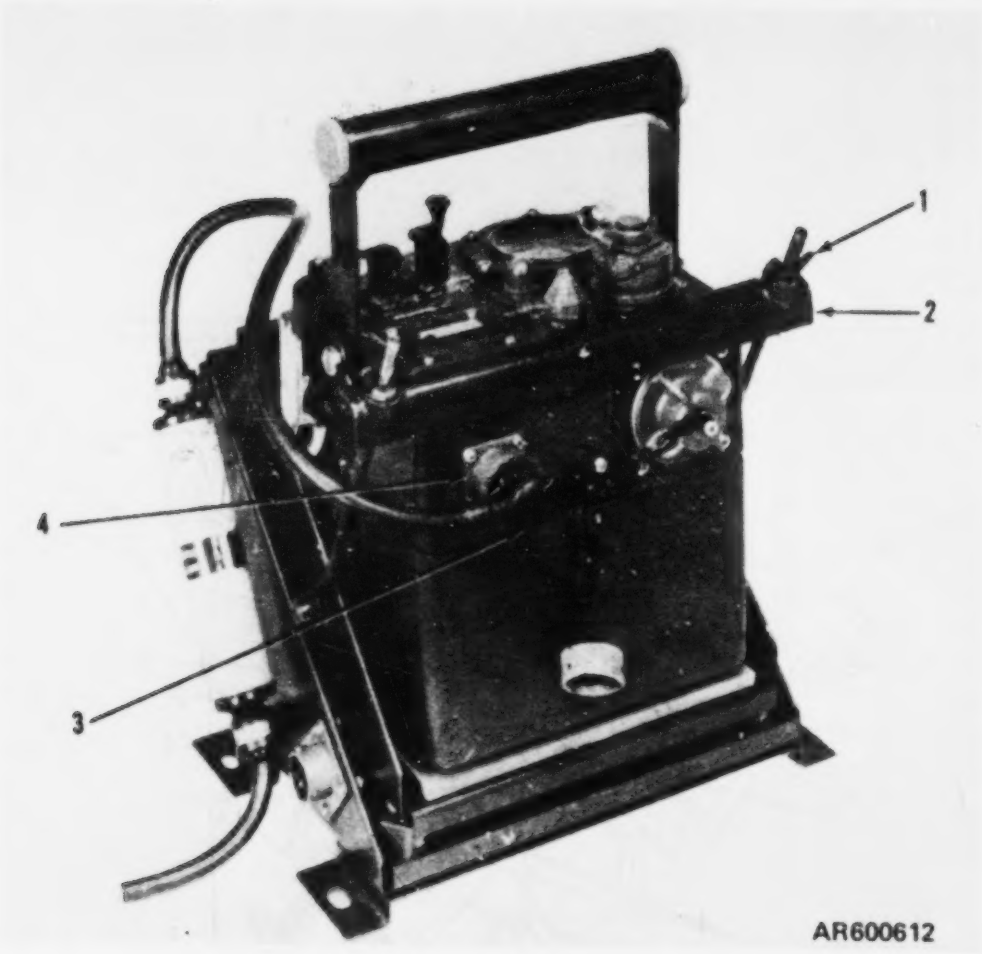
(5) Loosen strap (5) and place BA3517/U battery (4) in bracket (6).

(6) Position cable from battery so that it will be secured under strap when strap (5) is tightened.

(7) Tighten strap (5) to secure BA3517/U battery (4) in bracket (6).

(8) Remove drawer from M229 refill kit and position refill kit drawer (1, fig. 3-19) in bracket (3) on the battery box (4).

(9) Secure refill kit drawer (1) in bracket (3)



1 Wingnut
2 Clamp
3 Connector
4 24 VDC INPUT connector

Figure 3-13. M43 detector unit installed in low profile mount.

with strap (2).

(10) Position selector switch (9, fig. 3-18) to HORN ON.

(11) Perform startup and operation procedures (para 2-9) to place equipment in operation.

i. Installing an M42 Alarm Unit, a BA3517/U Battery, and Refill Kit Components in an Armored Command and Reconnaissance Vehicle.

(1) Perform procedures of paragraph 2-6*b*.

(2) Remove left periscope in driver's compartment (TM 9-2320-224-10).

(3) Position M42 alarm unit (1, fig. 3-20) in bracket (6).

(4) Install and latch clamping catches (3) over knurled screws (2) on M42 alarm unit.

(5) Remove protective tape from ends of cable harness wires (4) and connect wires to binding posts (5).

(6) Position selector switch (7) to HORN ON.

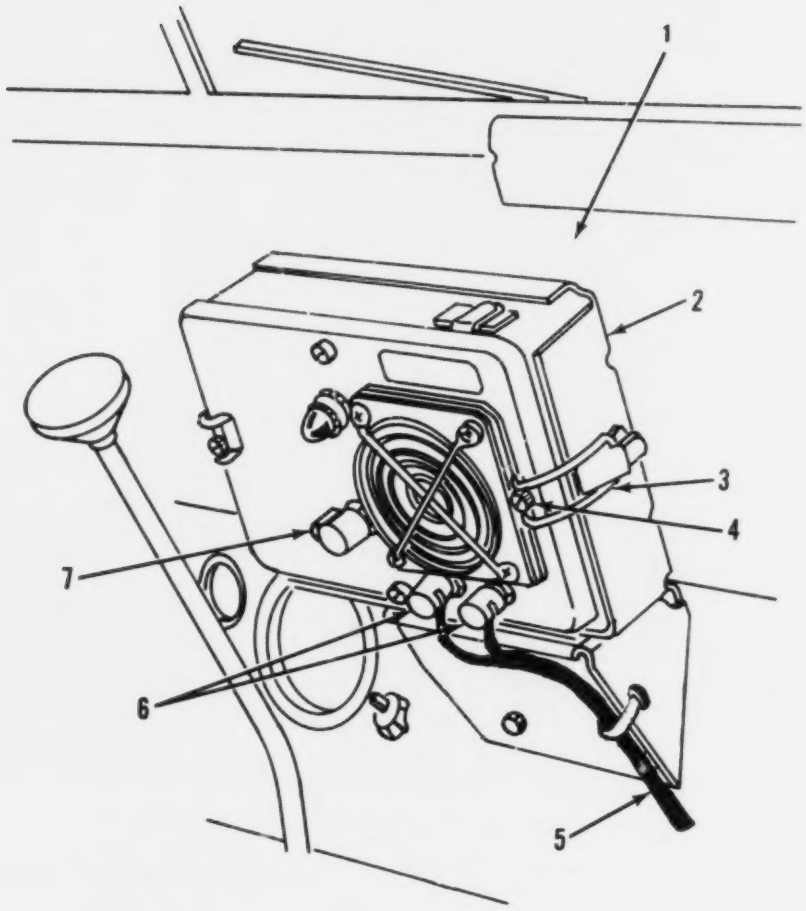
(7) Replace left periscope (TM 9-2320-224-10).

(8) Remove two shorter straps from battery bracket (3, fig. 3-21) mounted between periscope storage box (4) and jump seat (1) on right side of crew compartment sponson.

(9) Remove two drawers from M229 refill kit and secure to available strap loops (6) using two straps removed in (8) above.

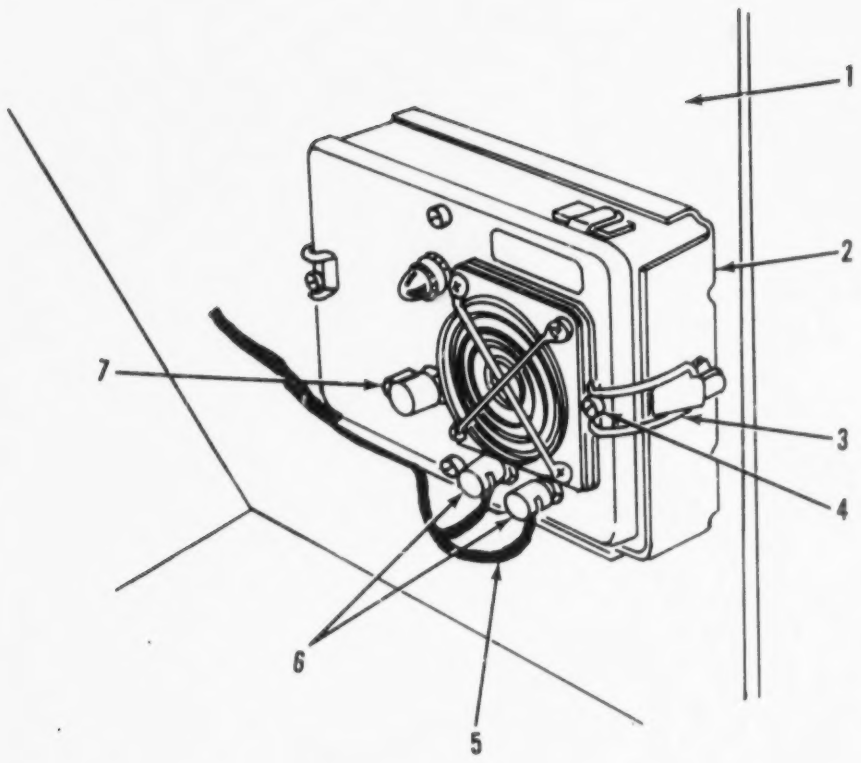
(10) Loosen longer strap (5) on battery bracket (3), position BA3517/U battery (2) on bracket, and secure it with strap (5).

(11) Perform startup and operation procedures (para 2-9) to place equipment in operation.



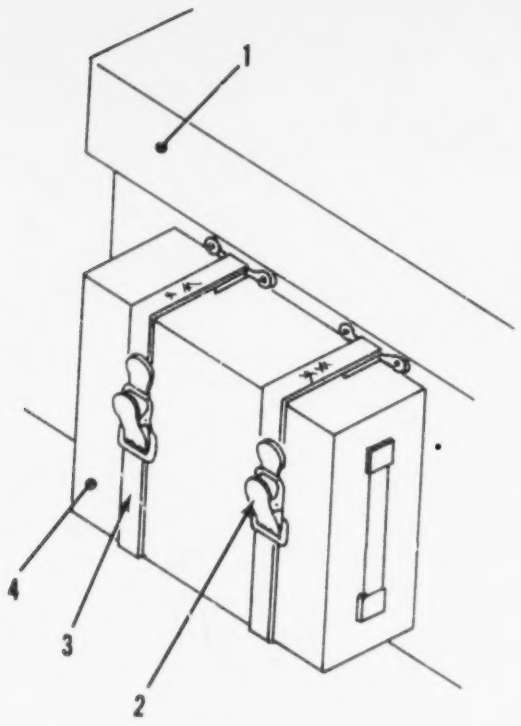
1 Dash panel
2 Bracket
3 Catches
4 Screws
5 Cable harness wires
6 Binding posts
7 Selector switch

Figure 3-14. M42 alarm unit installed in a 1/4-ton utility truck.



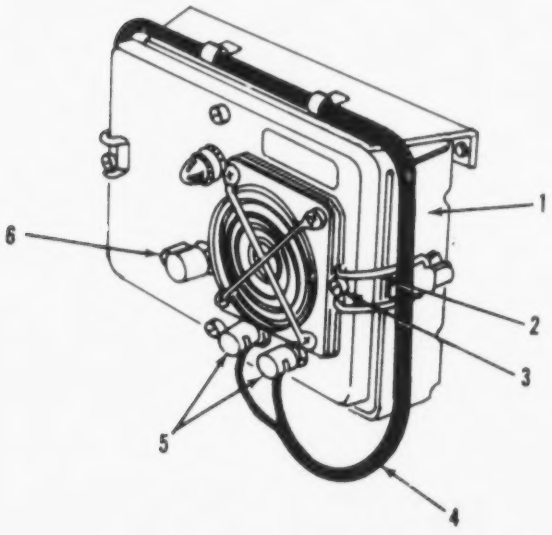
1 Right scuff plate
2 Bracket
3 Catches
4 Screws
5 Cable harness wires
6 Binding posts
7 Selector switch

Figure 3-15. M42 alarm unit installed in a 3/4-ton truck.



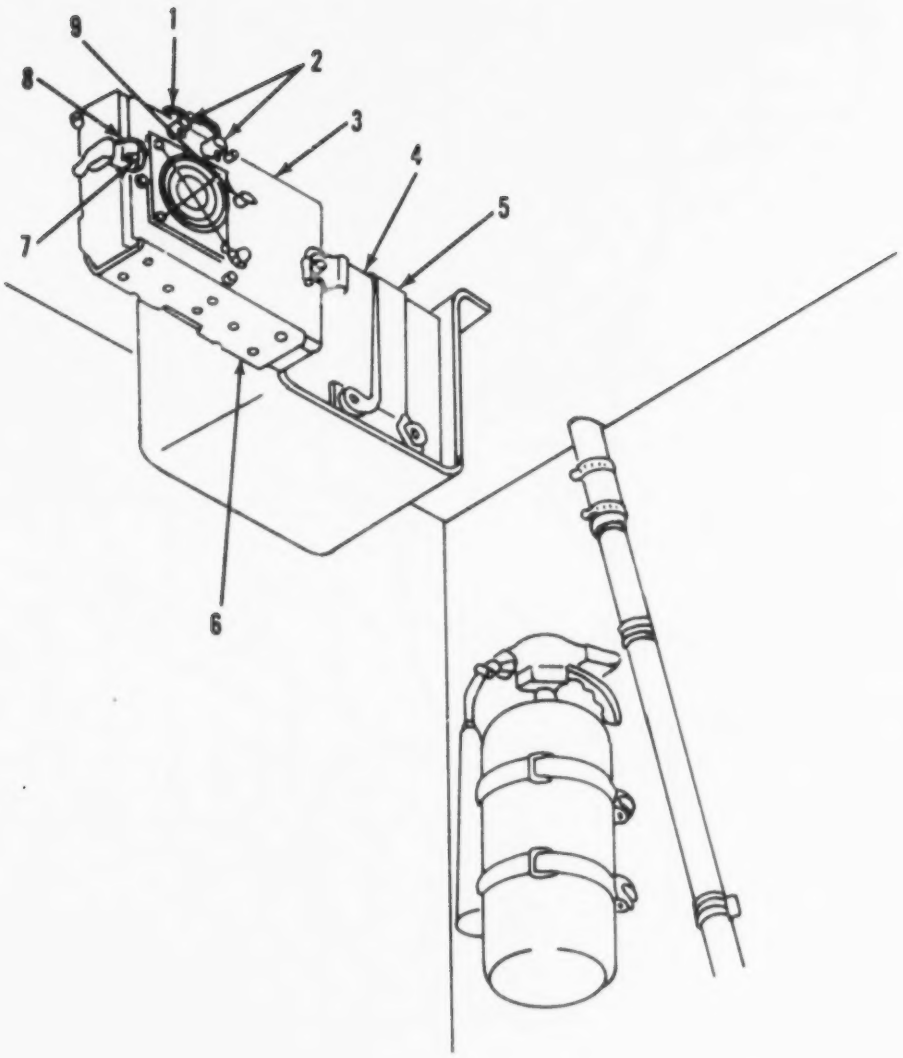
1 Passenger's cushion
2 Catch
3 Straps
4 Refill kit drawer

Figure 3-16. Refill kit drawer installed in a 3/4-ton truck.



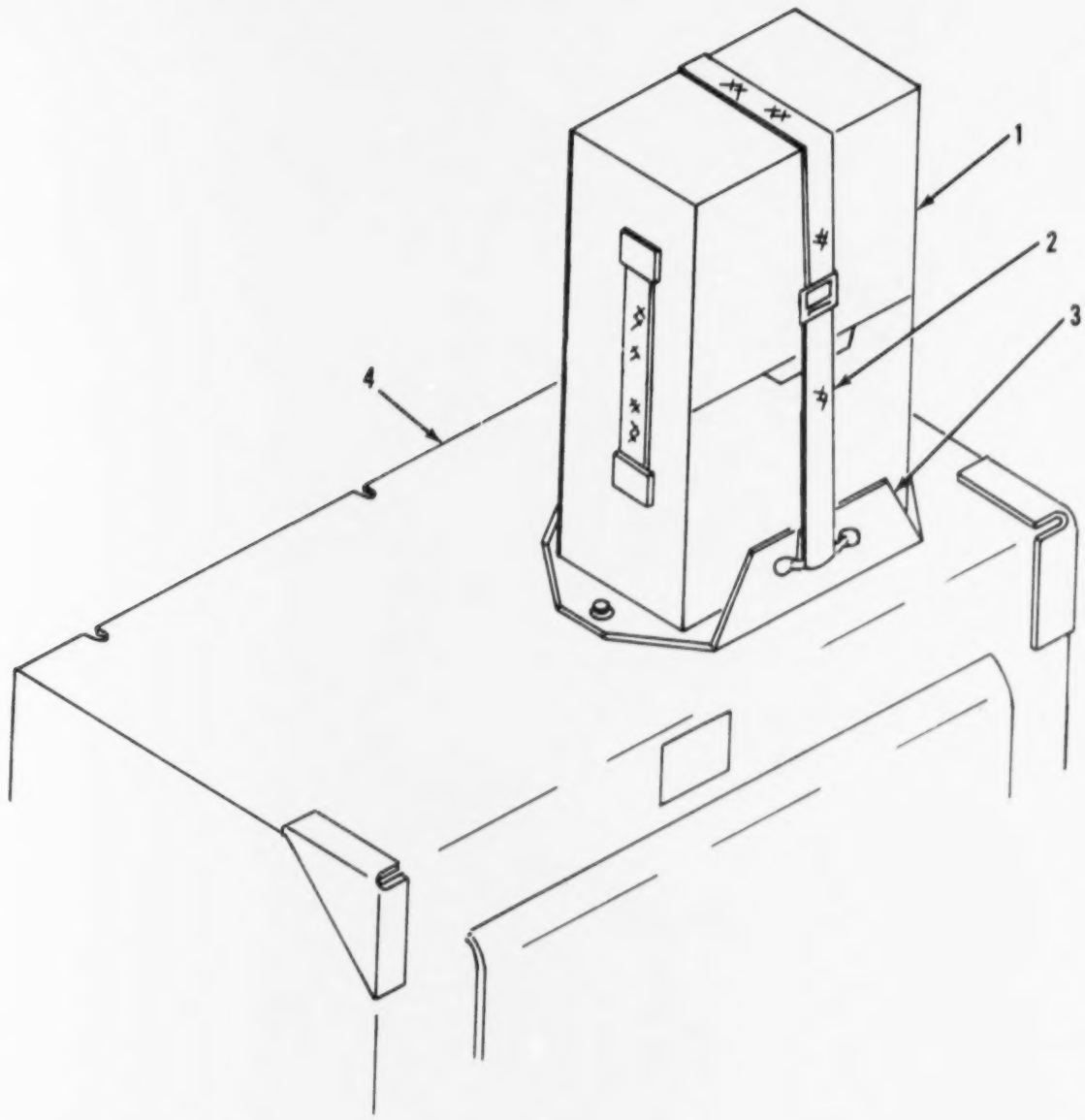
1 Bracket
2 Catch
3 Screw
4 Cable harness wires
5 Binding posts
6 Selector switch

Figure 3-17. M42 alarm unit installed in a 2 1/2-ton truck.



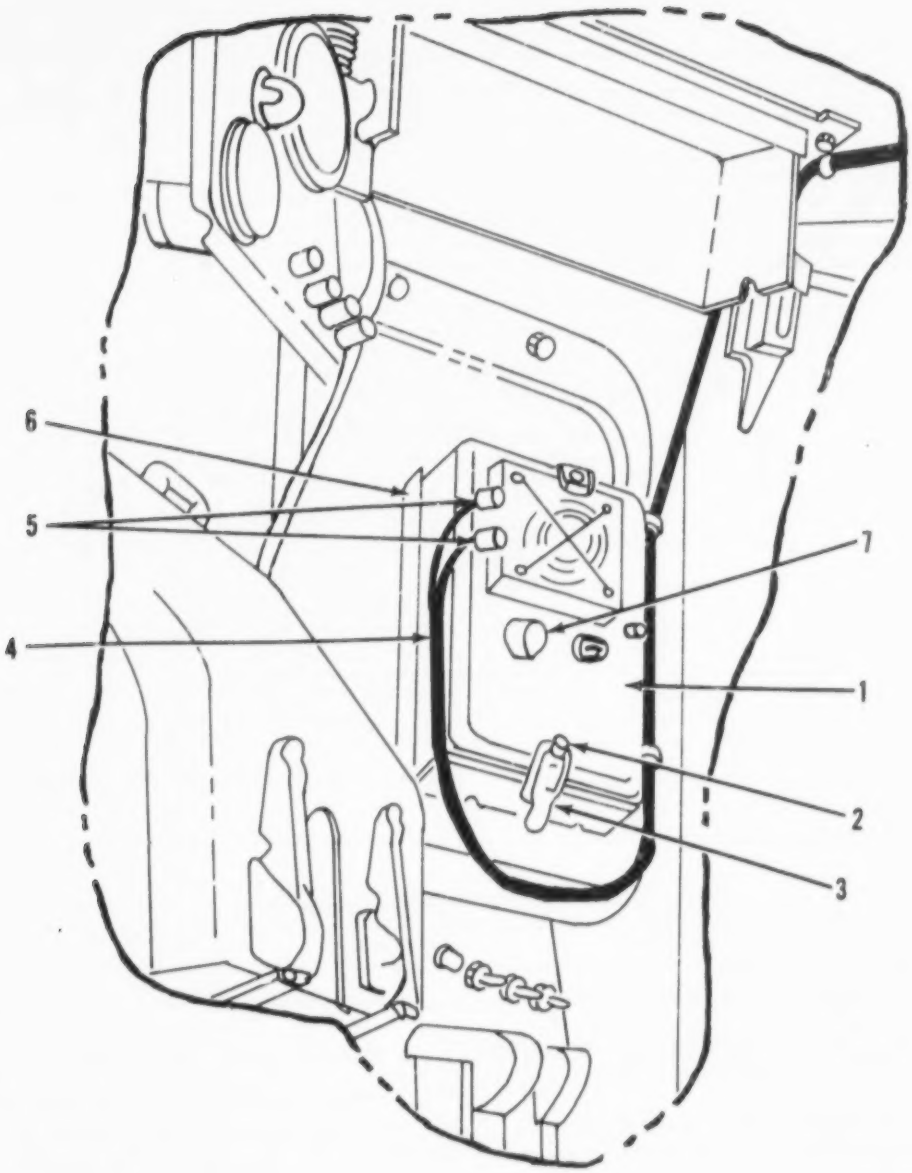
1 Cable harness wires
2 Binding posts
3 M42 alarm unit
4 BA3517/U battery
5 Strap
6 Bracket
7 Screw
8 Catch
9 Selector switch

Figure 3-18. M42 alarm unit and a BA3517/U battery installed in an armored personnel carrier and recovery vehicle.



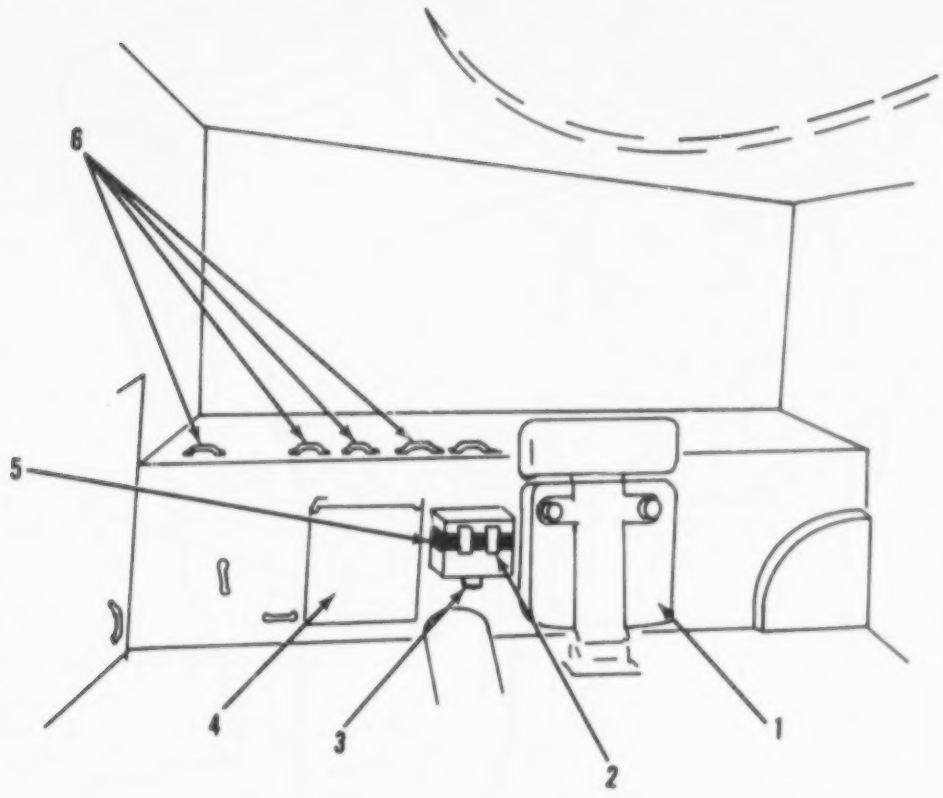
1 · Refill kit drawer
2 Strap
3 Bracket
4 Battery box

Figure 3-19. Refill kit drawer installed in an armored personnel carrier and recovery vehicle.



1 M42 alarm unit
2 Screws
3 Catches
4 Cable harness wires
5 Binding posts
6 Bracket
7 Selector switch

Figure 3-20. M42 alarm unit installed in an armored command and reconnaissance vehicle.



1 Jump seat
2 BA3517/U battery
3 Bracket
4 Periscope storage box
5 Strap
6 Strap loops

Figure 3-21. BA3517/U battery installed in an armored reconnaissance vehicle.

Section II. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

3-5. General

a. Purpose. Preventive maintenance checks and services, table 3-1, are routine procedures for maintaining equipment in top operating condition.

b. "Interval and sequence No." column. Perform the instructions for each item in the numerical sequence listed at the appropriate interval.

c. "Item to be Inspected-Procedure" column. Follow the instructions listed in this column as indicated in the "Interval and sequence No." column. Return defective equipment to organizational maintenance through your supervisor.

d. "Work time" column. The time required to perform each procedure is indicated in manhours (M/H). Total time required to perform the procedures listed for each interval (before, during, and after operation) is summarized above the column headings in table 3-1.

3-6. Mandatory Component Replacement Intervals

Table 3-2 lists parts of the M43 detector unit (fig. 1-2) and the M42 alarm unit (fig. 1-5) that must be replaced periodically by the operator. The replacement intervals are based on periods of operation.

Table 3-1. Operator and Crew Preventive Maintenance Checks and Services

B–Before Operation Time required: 1.2 | D–During Operation Time required: 0.1 | A–After Operation Time required: 0.9

Interval and sequence no.			Item to be inspected procedure	Work time (M/H)
B	D	A		
			M43 DETECTOR UNIT	
1		5	Check exterior for damaged, loose, or missing parts.	0.1
2		6	Check that RAINSHIELD assembly and FLOWMETER are installed in handle and are not damaged.	0.1
3		6.1	Separate bottom case assembly from detector unit assembly. Inspect for corroded, bent, or broken heater contacts (para 2-6*a*(3)). Check that detector cell is properly installed (para 2-6*a*(4)). Check that pump assembly is securely installed (para 2-6*a*(6)). Check that electronic module is securely installed (para 2-6*a*(7)). Check for evidence of solution in bottom case assembly and around solution reservoir assembly. Wipe bottom case assembly dry.	0.1
4			Check pump assembly accumulated hours (DA Form 2408-1) (fig. 2-9). Replace pump assembly if accumulated hours will exceed 1440 hours during mission (para 3-14).	0.1
		7	Perform appropriate shutdown procedures (para 2-13).	0.1
		8	Enter operational hours on DA Form 2408-1 (para 2-19).	0.1
			M42 ALARM UNIT	
1		3	Inspect exterior for damaged, loose, or missing parts.	0.1
2			Perform preoperational procedures (para 2-6*b*).	0.1
			BA3517/U BATTERY	
1		2	Inspect for damage (para 2-6*a*(1)).	0.1
			BB501/U BATTERY AND M168 CABLE	
1			Inspect and service in accordance with TM 11-6140-203-15-3 (para 2-6*a*(2)).	0.1
			M10 POWER SUPPLY	
1	2	3	Inspect and service in accordance with TM 3-6665-261-14.	0.1
			VEHICULAR INSTALLATIONS	
1		4	Check that mounting hardware is secure to vehicle. Tighten loose components.	0.1
2			Check that cable connections are secure.	0.1
3		5	Check for frayed insulation or other damage such as bent or defective connector pins.	0.1

3-6. Mandatory Component Replacement Intervals

Table 3-2 lists parts of the M43 detector unit (fig. 1-2) and the M42 alarm unit (fig. 1-5) that must be replaced periodically by the operator. The replacement intervals are based on periods of operation.

Table 3-2. Mandatory Component Replacement Intervals

End Item	Component to be replaced	Replace after operating for			
		24 hours per day	Less than 12 hours per day	8 hours or less per day	Reference
M 43 detector unit	Pump assembly	60 days	*	*	para 3-14
	Reservoir	12 hours	daily	daily	para 2-7*b*
	Air filter	12 hours	daily	daily	**para 2-7*c*
M42 alarm	BA3030 or BB3202/UF batteries	30 days	30 days	30 days	*para 3-16*

*1440 hours after last 1440-hour service. Refer to daily log DA Form 2408-1 (para 2-19).
**During operation in sand or dust conditions, replace air filter in accordance with table 2-1.

Section III. OPERATOR'S TROUBLESHOOTING

3-7. Scope

a. This section contains troubleshooting or malfunction information and tests for locating and correcting most of the troubles which may develop in the M43 detector unit and the M42 alarm unit. Each malfunction or trouble symptom for an individual component, unit, or system is followed by a list of tests or inspections necessary for you to determine probable causes and suggested corrective actions for you to remedy the malfunction.

b. This manual cannot list all possible mal-

functions that may occur or all tests or inspections and corrective actions. If a malfunction is not listed (except when malfunction and cause are obvious), or is not corrected by listed corrective actions, you should notify higher level maintenance.

c. Table 3-3 and table 3-4 list the common malfunctions that you may find during the operation or maintenance of the M43 detector unit and the M42 alarm unit, respectively. You should perform the tests or inspections and corrective actions in the order listed.

3-8. Disposition of Defective Parts

a. When substitution of a replacement pump assembly or electronic module during a test or inspection corrects the malfunction, do not discard, but return the original component to organization maintenance through your supervisor.

b. Dispose of all other defective components in accordance with local standing operating procedures (SOP).

Table 3-3. M43 Detector Unit Troubleshooting Table

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
1. SOLUTION IN BOTTOM CASE ASSEMBLY
Step 1. Check for loose reservoir assembly.
a. Tighten reservoir assembly using D-ring (fig. 2-3).
b. If damaged, prepare solution and install new reservoir assembly (para 2-7*b* and *c*).
Step 2. Check for loose or damaged pump assembly.
a. Secure latches.
b. If damaged, replace pump assembly (para 3-14).
Step 3. Check for improperly installed or damaged detector cell.
a. Tighten bail (9, fig. 1-3).
b. If damaged, replace detector cell (para 3-12).
2. HORN DOES NOT SOUND WHEN POWER SOURCE IS CONNECTED
Step 1. Check that ZERO ADJUST knob is fully clockwise and HORN VOL-BATTERY TEST control knob is fully clockwise when power source is connected.
a. Disconnect power source.
b. Press in and rotate ZERO ADJUST knob (5, fig. 2-1) fully clockwise and HORN VOL-BATTERY TEST knob (6) fully clockwise.
c. Wait one minute before reconnecting power source.
Step 2. Press HORN VOL-BATTERY TEST knob (6, fig. 2-1); METER indication must be 24 minimum. If less than 24, proceed as follows:
a. Substitute fresh BA3517/U battery or freshly-charged BB501/U battery. Refer to table 1-2 for proper battery applications at various temperatures.
b. Replace electronic module (para 3-13).
Step 3. Inspect cables for frayed or broken insulation, bent or broken connector pins, or other damage that could prevent proper operation. Replace defective cables.
Step 4. Check ambient air temperatures
If temperature is below 40 °F., perform startup procedures to warm up M43 detector unit.
3. HORN CONTINUES TO SOUND WHEN ZERO ADJUST KNOB IS PRESSED IN. PUMP ASSEMBLY DOES NOT OPERATE.
Step 1. Check that electronic module (10, fig. 1-3) is securely installed.
Remove and reinstall electronic module (para 3-13).
Step 2. Temporarily substitute replacement electronic module for electronic module in use (para 3-14).
If malfunction is corrected, leave replacement electronic module installed. If not, reinstall original electronic module.
4. PUMP CONTINUES TO OPERATE WHEN HORN SOUNDS
Step 1. Temporarily substitute replacement pump assembly for pump assembly in use (para 3-14).
If malfunction is corrected, leave replacement pump assembly installed. If not, reinstall, original pump assembly.
Step 2. Temporarily substitute replacement electronic module for electronic module in use (para 3-13).
If malfunction is corrected, leave replacement electronic module installed. If not, reinstall original electronic module.
5. PUMP DOES NOT OPERATE WHEN ZERO ADJUST KNOB IS PRESSED IN.
Step 1. Temporarily substitute replacement pump assembly for pump assembly in use (para 3-14).
If malfunction is corrected, leave replacement pump assembly installed. If not, reinstall original pump assembly.
Step 2. Temporarily substitute replacement electronic module for electronic module in use (para 3-13).
If malfunction is corrected, leave replacement electronic module installed. If not, reinstall original electronic module.
6. METER INDICATES MORE THAN 40 VOLTS WHEN HORN-VOL BATTERY TEST KNOB IS PRESSED IN.
Step 1. Check that knob is pressed in completely.
Step 2. Substitute known good power source and press in HORN VOL-BATTERY TEST knob to check reading.

Table 3-3. M43 detector unit troubleshooting table — continued

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
If voltage is still more than 40 volts, substitute replacement electronic module for electronic module in use (para 3-13); repeat test.
7. FLOWMETER INDICATIONS LOW
Step 1. Check that AIR INLET assembly is closed (fig. 2-5, A) and AIR OUTLET port is open (para 2-9*a*).
Step 2. Check that FLOWMETER is installed properly (para 2-9*h*).
Step 3. Check that AIR FILTER plug (7, fig. 1-2) is securely tightened.
Step 4. Check air filter for deposits of foreign matter.
a. Unscrew plug (4, fig. 2-4).
b. Remove air filter and inspect for foreign matter deposited on black side of air filter.
c. Replace dirty air filter (para 2-7*d*(3)).
Step 5. Check for loose reservoir assembly.
Tighten reservoir assembly using D-ring (fig. 2-3).
Step 6. Check for loose or damaged detector cell.
Tighten bail (9, fig. 1-3).
Step 7. Prepare solution and install new reservoir assembly (para 2-7*b* and *c*).
Step 8. Check that ball in FLOWMETER is not sticking.
a. Twist FLOWMETER (2, fig. 2-6) clockwise and remove it from AIR INLET assembly cover (4).
b. Hold FLOWMETER horizontal and check that ball moves freely by rocking FLOWMETER from side to side.
Step 9. Temporarily substitute replacement pump assembly in use (para 3-14).
If malfunction is corrected, leave replacement pump assembly installed. If not, reinstall original pump assembly.
Step 10. If air temperature is below 40 °F., perform startup procedures to warm up M43 detector unit (para 2-15*j*).
8. FLOWMETER INDICATIONS HIGH
Step 1. Check that air filter is not missing or defective.
a. Unscrew plug (4, fig. 2-4).
b. Install air filter if necessary (para 2-7*d*).
Step 2. Temporarily substitute replacement pump assembly for pump assembly in use (para 3-14).
If malfunction is corrected, leave replacement pump assembly installed. If not, reinstall original pump assembly.
9. METER INDICATION TOO HIGH, ERRATIC, OR MISSING
Step 1. Press in HORN VOL-BATTERY TEST knob (6, fig. 2-1) and release to check that switch does not stick.
Step 2. Press in ZERO ADJUST knob (5) and rotate counterclockwise to check for indication in blue zone on meter.
a. Hold ZERO ADJUST knob pressed in.
b. Press in hand crank (2), rotate crank clockwise 50 turns, and release it.
NOTE Keep hand crank in down position, not pressed in.
c. Rotate ZERO ADJUST knob (still pressed in) for indication in blue zone. Release knob.
d. If necessary, press and reset. ZERO ADJUST knob after 5 minutes.
Step 3. Temporarily substitute replacement electronic module for electronic module in use (para 3-13).
If malfunction is corrected, leave replacement electronic module installed. If not, reinstall original electronic module.
Step 4. Temporarily substitute replacement pump assembly for pump assembly in use (para 3-14).
If malfunction is corrected, leave replacement pump assembly installed. If not, reinstall original pump assembly.
10. M43 DETECTOR UNIT DOES NOT RESPOND TO SIMULANT IN SENSITIVITY CHECK BOTTLE WITHIN 5 MINUTES
Step 1. Temporarily substitute replacement detector cell for detector cell in use (para 3-12).
Step 2. Repeat applicable procedures in paragraph 2-9*a* through *p* to check response to simulant in sensitivity check bottle.
If malfunction is corrected, leave replacement detector cell installed. If not, reinstall original detector cell.
Step 3. Temporarily substitute replacement pump assembly for pump assembly in use (para 3-14).
Step 4. Repeat applicable procedures in paragraph 2-9*a* through *p* to check response to simulant in sensitivity check bottle.
If malfunction is corrected, leave replacement pump assembly.
Step 5. Temporarily substitute replacement electronic module for electronic module in use (para 3-13).
Step 6. Repeat applicable procedures in paragraph 2-9*a* through *p* to check response to simulant in sensitivity check bottle.
If malfunction is corrected, leave replacement electronic module installed. If not, reinstall original electronic module.

Table 3-4. M42 alarm unit troubleshooting table

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
1. ALARM-RED INDICATOR AND LOUDSPEAKER INOPERATIVE
Step 1. Position selector switch (8, fig. 1-5) to TEST. If no response, replace batteries (para 3-16).
Step 2. Check for damaged telephone cable wires (para 3-2*d*) between M42 alarm unit and M43 detector unit or loose connection at binding posts (7, fig. 1-5).
a. Replace damaged telephone cable.
b. Reconnect loose wires.
2. ALARM-RED INDICATOR FLASHES, BUT LOUDSPEAKER INOPERATIVE
Check that selector switch is positioned to HORN ON.
Position selector switch to HORN ON.

Section IV. M43 DETECTOR UNIT

3-9. General

The operator is authorized to replace a defective flow rate meter (FLOWMETER), rainshield assembly, detector cell, electronic module, and pump assembly.

3-10. FLOWMETER

Remove FLOWMETER (3, fig. 1-3) by unscrewing it (counterclockwise) from handle (2). Install replacement FLOWMETER by screwing it (clockwise) into handle.

3-11. RAINSHIELD Assembly

Remove RAINSHIELD assembly (1, fig. 1-3) by unscrewing it (counterclockwise) from handle (2). Install replacement RAINSHIELD assembly by screwing it (clockwise) into handle.

3-12. Detector Cell

a. Removal. Each new detector cell must be stabilized after installation. Stabilization is accomplished during startup and operation (para 2-9).

(1) Release four catches (12, fig. 1-2) from catches (13) and separate detector assembly (6) from bottom case assembly (9).

(2) Turn the lobed nut of bail (2, fig. 3-22) counterclockwise and swing bail away from detector cell (3).

CAUTION

Do not twist or exert excessive side motion to detector cell during removal or detector cell ports may be broken and left in chassis.

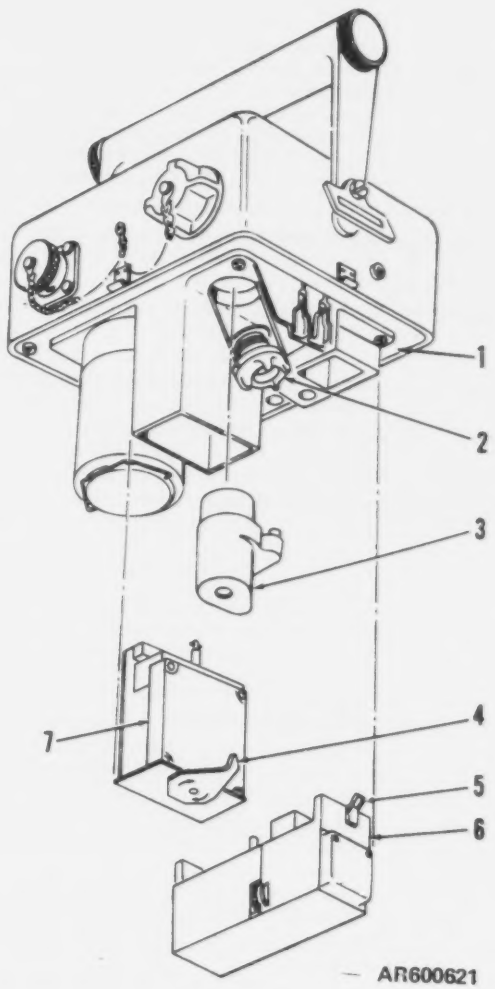
(3) While rocking detector cell (3) gently, pull it directly from chassis assembly (1).

b. Replacement.

(1) Remove detector cell from its can. Remove plastic bag, two caps, and plug from detector cell.

(2) Dampen outside of the two detector cell ports with a few drops of water.

(3) Position detector cell (3) so that its ports are alined with their corresponding fittings in chassis assembly (1). Press detector cell into place in chassis assembly.



1 Chassis assembly
2 Bail
3 Detector cell
4 Turnlock fastener
5 Catch
6 Pump assembly
7 Electronic module

Figure 3-22. M43 detector unit modular components.

(4) Center bail (2) on bottom of detector cell (3) and turn lobed nut clockwise until fingertight.

(5) Replace detector assembly (6, fig. 1-2) in bottom case assembly (9) and secure four catches (12).

3-13. Electronic Module

a. Removal.

(1) Release four catches (12, fig. 1-2) from catches (13) and separate detector assembly (6) from bottom case assembly (9).

(2) Rotate turnlock fastener (4, fig. 3-22) fully counterclockwise and pull electronic module (7) from its housing on chassis assembly (1).

b. Replacement.

(1) Position electronic module (7) so that its electrical connector will mate with electrical connector in chassis assembly (1).

(2) Slide electronic module (7) into housing on chassis assembly (1).

(3) Push turnlock fastener (4) toward chassis assembly (1). Rotate turnlock fastener clockwise until its tip touches housing and electronic module (7) is secured in position.

(4) Replace detector assembly (6, fig. 1-2) in bottom case assembly (9) and secure four catches (12).

3-14. Pump Assembly

a. Removal.

(1) Release four catches (12, fig. 1-2) from catches (13) and separate detector assembly (6) from bottom case assembly (9).

(2) Release two catches (5, fig. 3-22) on pump assembly (6).

(3) If necessary, rock pump assembly (6) slightly while pulling it directly away from chassis assembly (1).

(4) Record pump assembly operating hours since last tubing replacement on modified DA Form 2408-1 (para 2-20).

b. Replacement.

(1) Dampen outside of the four ports on top of pump assembly (6) with water.

(2) Position pump assembly (6) so that its electrical connector and ports are alined with their receptacles in chassis assembly (1).

(3) Press pump assembly (6) into place in chassis. Secure pump assembly in position with two catches (5).

(4) Replace detector assembly (6, fig. 1-2) in bottom case assembly (9) and secure four catches (12).

(5) Enter the hours when next pump assembly replacement is due on M43 daily log (para 2-19).

Section V. M42 ALARM UNIT

3-15. General

The operator is authorized to replace batteries in the M42 alarm unit.

3-16. Batteries

a. Removal.

(1) Position selector switch (6, fig. 3-23) to HORN OFF.

(2) Loosen four knurled screws (2) and separate chassis assembly (4) from housing (5).

(3) Release spring-tension clip (8) and open hinged cover of the battery retainer (9).

(4) Remove batteries (7) from battery retainer (9).

b. Replacement.

CAUTION

Observe battery polarity as shown on label inside battery retainer.

(1) Install four BA3030 batteries in battery retainer (9), close hinged cover, and secure it with spring-tension clip (8).

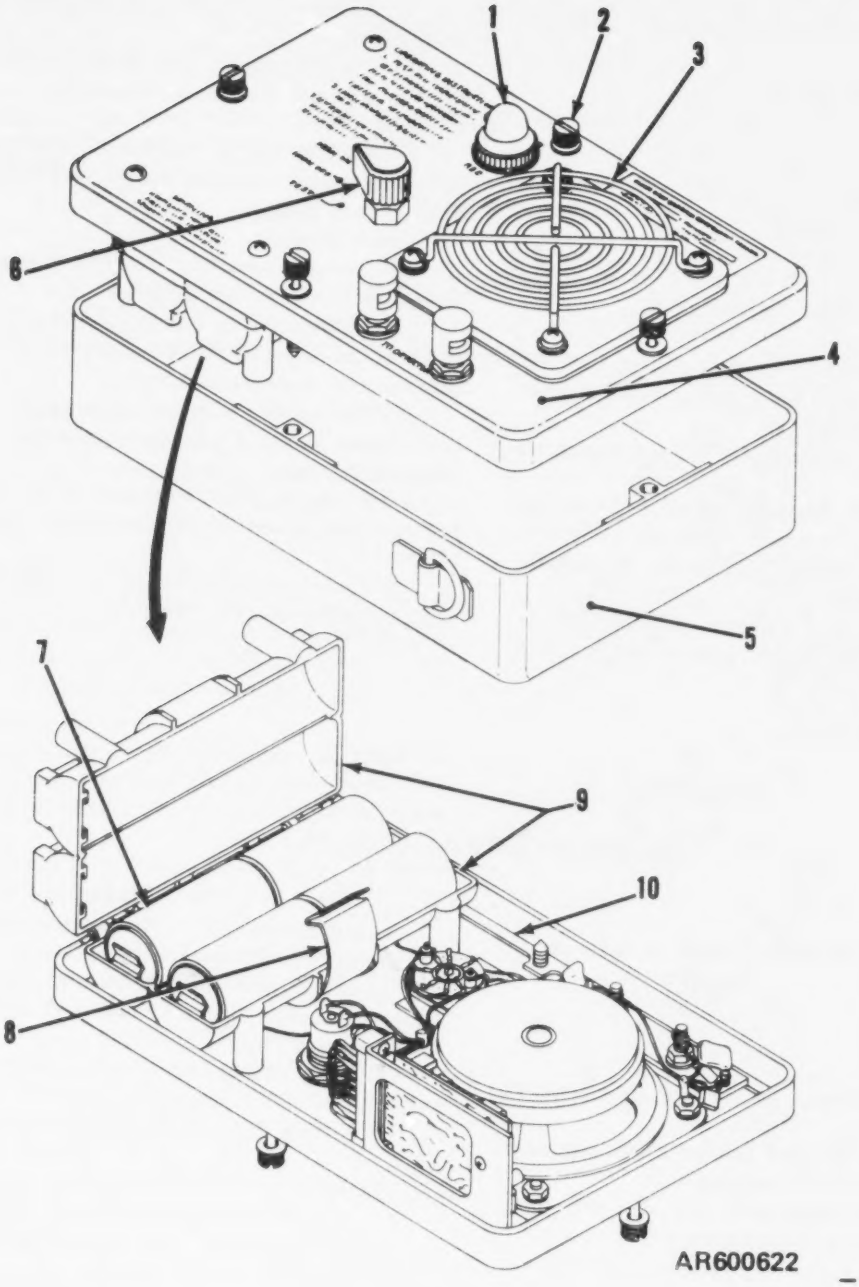
(2) With gasket (10) in place, position chassis assembly (4) in housing (5).

(3) Secure by tightening four knurled screws (2).

c. Test.

(1) Position selector switch (6) to TEST. Loudspeaker (3) will sound and ALARM-RED indicator (1) will flash.

(2) Set selector switch (6) to HORN OFF.



1 ALARM-RED indicator
2 Screw
3 Loudspeaker
4 Chassis assembly
5 Housing
6 Selector switch
7 Batteries
8 Clip
9 Battery retainer
10 Gasket

Figure 3-23. M42 alarm unit battery installation.

CHAPTER 4

ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF MATERIEL

4-1. New Materiel

a. M43 Detector Unit. Perform procedures in paragraph 2-6*a*.

b. M42 Alarm Unit. Perform procedures of paragraph 2-6*b*.

c. M10 Power Supply. Perform procedures of paragraph 2-6*c*.

d. Battery Power Sources. Perform procedures of paragraph 2-6*e*.

e. M229 Refill Kit. Discard an M229 refill kit with an expired date. Unbuckle and discard the strap (2, fig. 1-6) and slide the two drawers (1) from the sleeve (4). Examine the air filter packages for damage. Check that each solution reservoir assembly (5) is filled to the mark and that the solution is clear. Examine the sensitivity check bottles (6) for leaks.

f. Vehicular Installation Components.

(1) *Installation kit.* Forward the installation kit to the maintenance facility responsible for installing the components in the vehicle.

(2) *Mounting kit.* Forward the mounting kit to the maintenance facility responsible for installing it on a vehicular installation kit.

4-2. Used and Reconditioned Materiel

Treat used and reconditioned materiel the same as new materiel. Perform the applicable instructions of paragraph 4-1 to insure operational readiness of the equipment.

Section II. ORGANIZATIONAL MAINTENANCE TROUBLESHOOTING

4-3. General

Organizational Maintenance is responsible for isolating and replacing defective electrical cables in vehicular installations.

4-4. Mounting kits

Perform troubleshooting procedures described in the Maintenance section of TM 3-6665-273-20.

4-5. Installation Kits

Refer to the chapter in TM 3-6665-274-20 applicable to the vehicular installation. Perform post installation checkout and troubleshooting instructions to isolate the trouble.

Section III. MONTHLY LOG FOR M43 DETECTOR UNIT

4-6. General

Equipment Daily or Monthly Log (DA Form 2408-1) is used to record and accumulate monthly operational hours of an M43 detector unit (fig. 1-2). It also provides a means of recording scheduled and unscheduled servicing of the pump assembly. Organizational maintenance personnel must maintain the monthly log.

4-7. Modification and Use of DA Pam 2408-1

(fig. 4-1)

a. The instructions of TM 38-750, paragraph 4-5*c* (1) are applicable.

b. Block 1. Enter "DETECTOR UNIT, CHEMICAL AGENT AUTOMATIC ALARM: PORTABLE, M43."

c. Block 2. Line out "REGISTRATION OR" and enter the M43 detector's serial number.

d. Block 3.

(1) Line out "OR LUBRICATION" in block.

(2) Block 3a and 3c are not applicable.

(3) Block 3b. Enter the hours when the next pump assembly service is due as indicated by the last entry on the daily log.

e. Block 4.

(1) Enter a check in the monthly block.

(2) Block 4a. Enter the month and year.

(3) Block 4b. Line out "READING" and add "MONTHLY." Enter the total monthly operational hours.

(4) Block 4c. Line out "READING MILES" and add "TOTAL HOURS." Enter cumulative hours operated.

(5) Columns 4d through 4j are not applicable.

(6) Column 4k. Same as TM 38-750, paragraph 4-5*d* (15).

(7) "REMARKS" block. Same as TM 38-750, paragraph 4-5*d* (16).

For use of this form, see TM 38-750; the proponent agency is Office of the Deputy Chief of Staff for Logistics.

1. NOMENCLATURE: DETECTOR UNIT, CHEMICAL AGENT AUTOMATIC ALARM: PORTABLE, M43
2. REGISTRATION OR SERIAL NUMBER: 0012
3. NEXT SERVICE — a. TYPE; b. HOURS: 1440; c. DATE
4. TYPE LOG: ☐ DAILY ☑ MONTHLY

DATE OF ENTRY (a)	MAINT HOURS (b)	TOTAL HOURS (c)	TOTAL FUEL ADDED (Gals) (d)	OIL CHANGED OR ADDED (Qts) (e): ENGINE	TRANSMISSION	OPERATIONAL STATUS (f): EQUIPMENT FAULTY	IS EQUIPMENT OPERATIONAL?	SIGNATURE OF OPERATOR OR CREW CHIEF (g)	SERVICE OR LUB (h): TYPE	COMPLETED?	OTHER ACTIONS (i)	NONAVAILABLE DAYS (j): ORG MAINT D	ORG MAINT M	SUPPORT MAINT D	SUPPORT MAINT M	SIGNATURE OF INDIVIDUAL MAKING ENTRIES OTHER THAN OPERATOR OR CREW CHIEF (k)
Jan 71	-	692	(Brought forward from previous 2408-1)													
Feb 71	174	866														T. Clark
Mar 71	183	1049														T. Clark
Apr 71	248	1297														T. Clark
																T. Clark

DA FORM 2408-1, 1 May 67 — REPLACES EDITION OF 1 JAN 64 AND DA FORM 2408-2, 1 APR 58, WHICH ARE OBSOLETE. — EQUIPMENT DAILY OR MONTHLY LOG

AR600623

Figure 4-1. Sample DA Form 2408-1 modified for recording monthly log.

Section IV. M43 DETECTOR UNIT

4-8. General

Authorized repair of the M43 detector unit by organizational maintenance personnel is limited to replacement of defective gaskets and preformed packings on the rainshield assembly and flow rate meter.

4-9. RAINSHIELD Assembly

a. Unscrew RAINSHIELD assembly (1, fig. 1-3) from handle (2) and pull rainshield (13) away from adapter (14).

b. Remove and replace defective gasket (2, fig. 4-2) on rainshield (1).

c. Remove and replace defective performed packing (4) on adapter (3).

d. Press adapter (14, fig. 1-3) into rainshield (13) and screw RAINSHIELD assembly (1) into handle (2).

4-10. Flow Rate Meter (FLOWMETER)

a. Unscrew FLOWMETER (3, fig. 1-3) from handle (2).

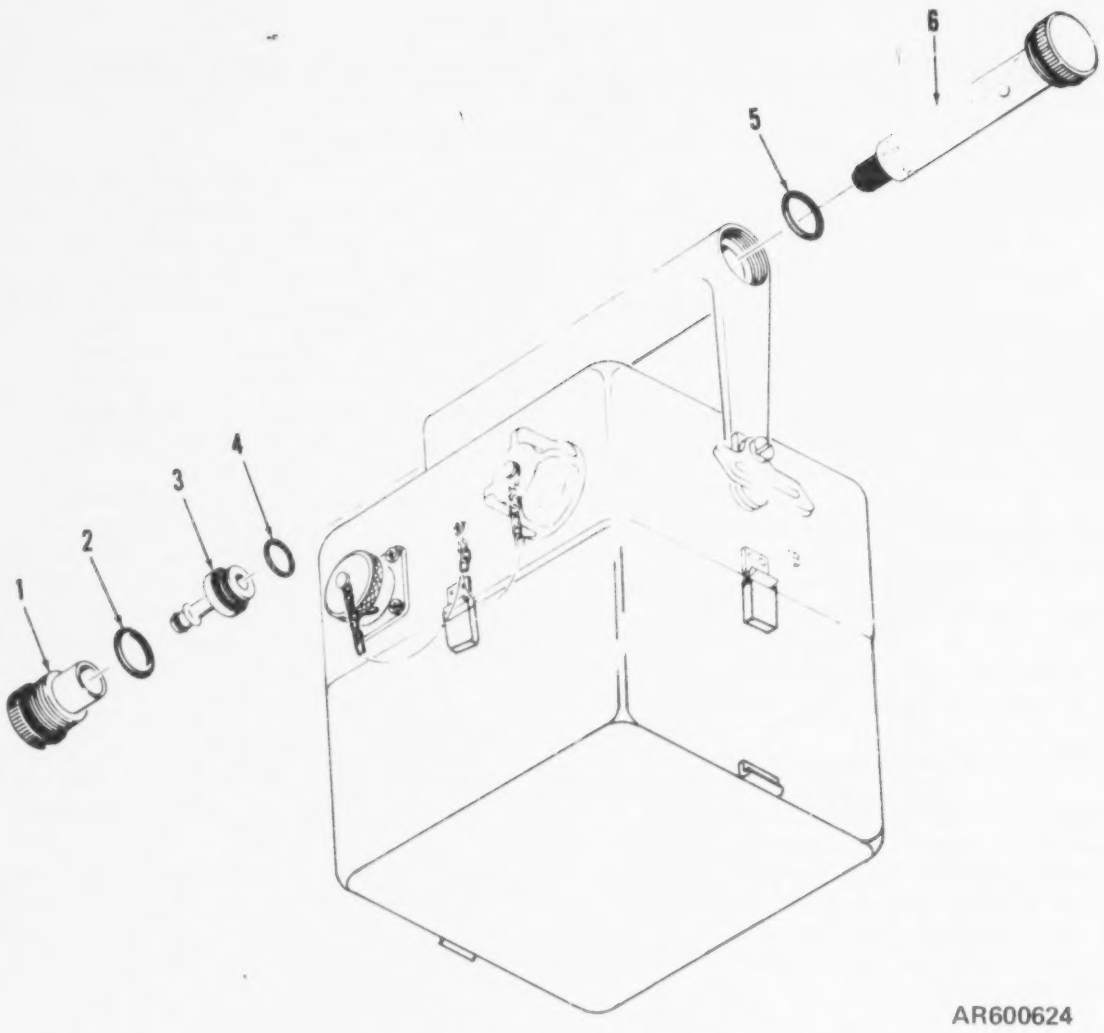
b. Remove and replace defective gasket (5, fig. 4-2) from flow rate meter (6).

c. Screw FLOWMETER (3, fig. 1-3) into handle (2).

Section V. M42 ALARM UNIT

4-11. General

Repair of the M42 alarm unit by organizational maintenance personnel is limited to replacement of the selector switch knob, knurled screws that secure the panel to the housing, and the ALARM-RED indicator lens and lamp.



1	Rainshield	4	Preformed packing
2	Gasket	5	Gasket
3	Adapter	6	Flow rate meter

Figure 4-2. RAINSHIELD assembly and flow rate meter components.

4-12. Selector Switch Knob

(fig. 4-3)

a. Rotate knob (7) fully clockwise.

b. Loosen two setscrews (6) and remove knob (7) from selector switch shaft.

c. Position replacement knob (7) on selector switch shaft so that its pointer is at HORN ON.

d. Tighten two setscrews (6) to secure knob (7) to shaft.

4-13. Knurled Screws

(fig. 4-3)

a. Unscrew defective screw (3) from housing (8) and then from chassis assembly (1).

b. Remove packing (2).

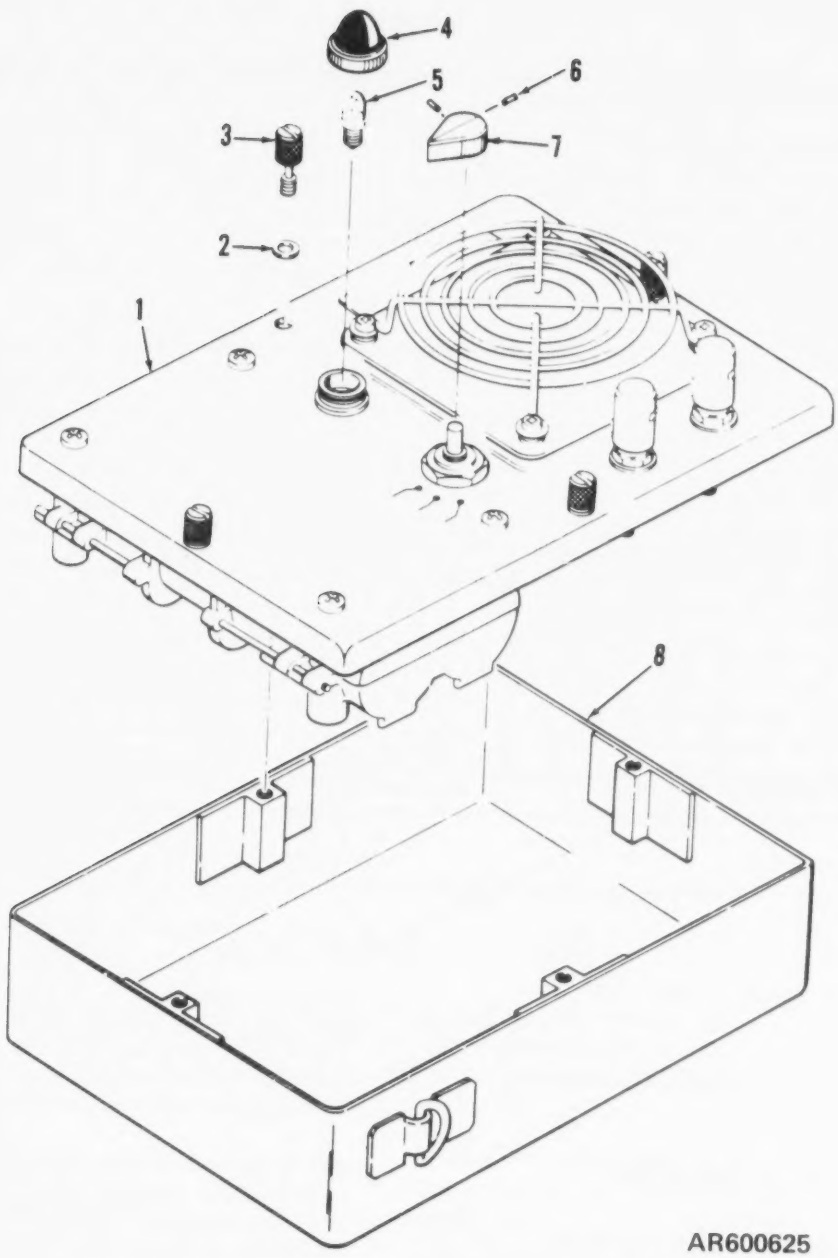
c. Replace screw (3) by reversing order of disassembly (*a* and *b* above).

4-14. ALARM-RED Indicator Lens and Lamp

(fig. 4-3)

a. Unscrew lens (4) and remove lamp (5) after pressing it in and turning it counterclockwise.

b. Replace defective lamp (5) or lens (4) by reversing order of removal.



1	Chassis assembly	5	Lamp
2	Packing	6	Setscrew
3	Screw	7	Knob
4	Lens	8	Housing

Figure 4-3. M42 alarm unit, exploded view.

CHAPTER 5
PREPARATION FOR SHIPMENT AND ADMINISTRATIVE STORAGE

Section I. PREPARATION FOR SHIPMENT

5-1 M43 Detector Unit

a. General. Before the M43 detector unit is shipped to another organization, it must be cleared of residual solution and inspected, the meter and handcrank must be protected from damage, and all ports must be closed.

b. Procedure.

(1) Disconnect power source from 24 VDC INPUT connector (11, fig. 1-2).

(2) Release four catches (12) and remove detector unit assembly (6) from bottom case assembly (9).

CAUTION

Keep weight assembly free from dirt after removing reservoir assembly.

(3) Hold detector unit assembly upright by its handle (2, fig. 1-3) and unscrew reservoir assembly (12). Allow the weight assembly (12.1) to hang down. If solution is in reservoir assembly, discard it in accordance with standing operating procedures.

CAUTION

Use only distilled water (4 or 5, table 1-3) when preparing the detector unit assembly for shipment. Use of water which contains impurities will cause damage to the detector cell.

(4) Rinse reservoir assembly with distilled water (4 or 5, table 1-3) and fill it approximately two-thirds with distilled water.

(5) Center reservoir assembly under weight assembly and screw reservoir assembly (12) into mounting hole in chassis (4). Insure a tight seal by turning reservoir assembly D-ring clockwise.

(6) Check that seal (1, fig. 1-4) is correctly seated in groove around top of bottom case assembly (9, fig. 1-2). Assemble detector unit assembly (6) to bottom case assembly (9) and secure four catches (12).

(7) Remove AIR OUTLET CAP (15) from port.

(8) Remove electrical connector cover (10) from 24 VDC INPUT receptacle (11).

(9) Check that AIR INLET assembly is in CLOSED position (fig. 2-5, A). Unscrew plug (1).

(10) Attach power source connector to the 24 VDC INPUT connector (11, fig. 1-2). If horn (3, fig. 2-1) sounds, press ZERO ADJUST knob (5) and rotate it fully counterclockwise.

(11) Press handcrank (2) in, rotate the handcrank 50 turns, and release it. Do not pull the handcrank out.

(12) Allow M43 detector unit to run for 4 minutes. Then disconnect power source from the 24 VDC INPUT connector (11, fig. 1-2).

(13) Release four catches (12) and remove detector unit assembly (6) from bottom case assembly (9).

(14) Hold detector unit assembly upright by its handle (2, fig. 1-3) and unscrew reservoir assembly (12).

(15) Discard contents of reservoir assembly (12) and screw empty reservoir assembly into mounting hole in chassis (4).

(16) Install detector unit assembly (6, fig. 1-2) in bottom case assembly (9) and secure it with four catches (12).

(17) Install AIR OUTLET cap (15) in AIR OUTLET port.

(18) Screw plug (1, fig. 2-5) into AIR INLET assembly. Check that AIR INLET assembly is set to CLOSED.

(19) Install electrical connector cover (10, fig. 1-2) on 24 VDC INPUT connector (11).

(20) Pull up handcrank (19) to storage position.

(21) Using figure 5-1 as a guide, fabricate a shipping guard from corrugated cardboard. After cutting PIECE B from PIECE A, fold PIECE B in half and slide it over the extended handcrank shaft. Secure PIECE B in position with PIECE A as shown in figure 5-1 to protect the meter window and keep the handcrank in the storage position.

(22) Release catch (12, fig. 1-2) on BA3517/U battery, if applicable, and remove the battery before shipping the M43 detector unit.

5-2. M42 Alarm Unit

a. General. Before the M42 alarm unit is shipped to another organization, remove the four batteries.

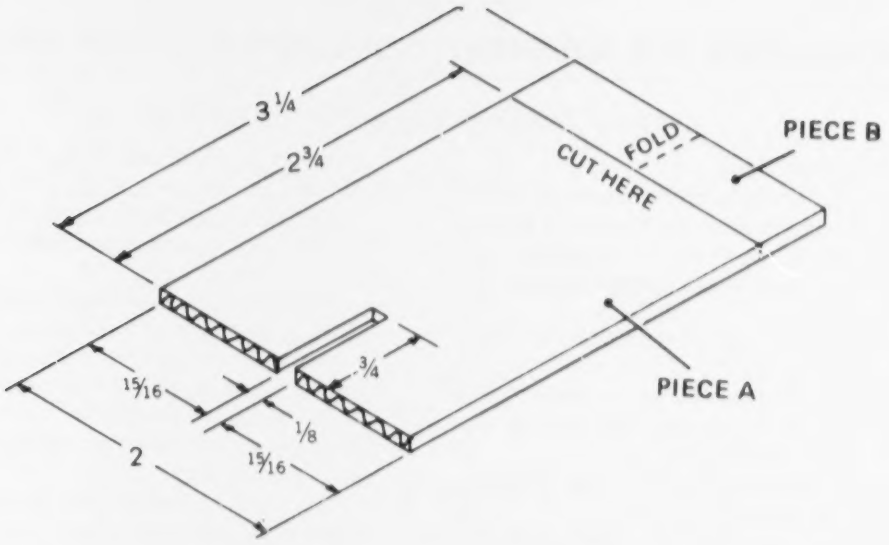
b. Procedure.

(1) Remove the batteries as described in paragraph 3-16*a*.

(2) Close hinged cover and secure it with spring-tension clip (8).

(3) With gasket (10) in place, position chassis assembly (4) in housing (5).

(4) Secure by tightening four knurled screws (2).



MATERIAL: CORRUGATED CARDBOARD, 1/8-IN. THICK

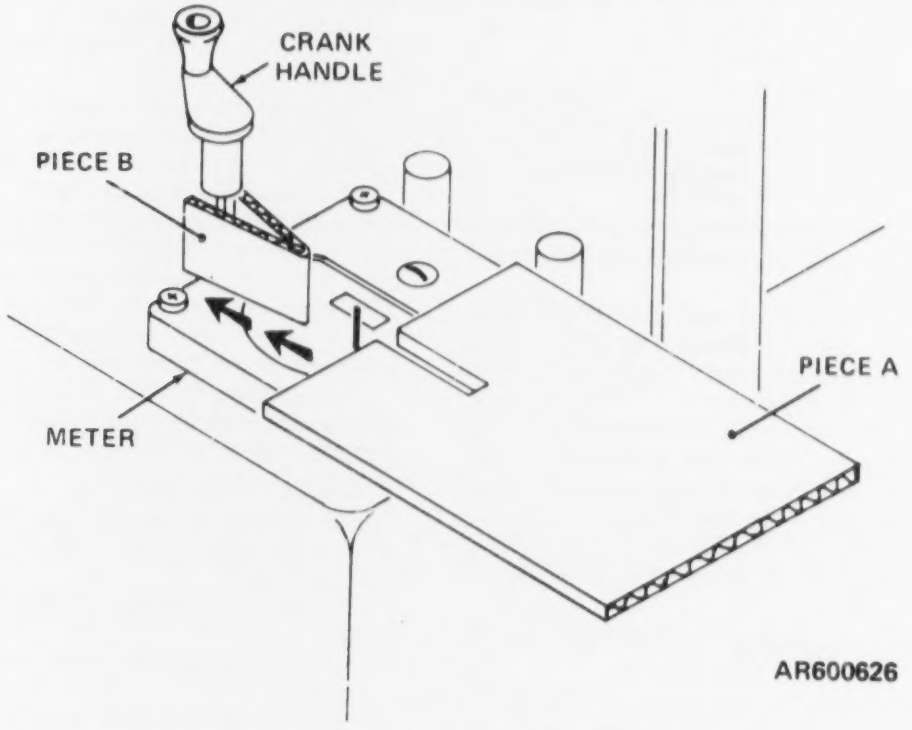


Figure 5-1. Shipping guard fabrication and installation diagram.

Section II. ADMINISTRATIVE STORAGE

5-3. M43 Detector Unit

Prepare the M43 detector unit for storage in the same manner as it is prepared for shipment (para 5-1).

5-4. M42 Alarm Unit

Prepare the M42 alarm unit for storage in the same manner as it is prepared for shipment (para 5-2).

APPENDIX A

REFERENCES

CTA 50-970	Expendable Items (Except: Medical, Class V, Repair Parts and Heraldic Items).
FM 21-41	Soldier's Handbook for Defense Against Chemical and Biological Operations and Nuclear Warfare.
SB 708-42	Federal Supply Code for Manufacturers—United States and Canada—Code to Name (Cataloging Handbook H 4-2 (Microfiche).
TM 3-220	Chemical, Biological, and Radiological (CBR) Decontamination.
TM 3-6665-261-14	Operator's, Organizational, Direct Support, and General Support Maintenance Manual: Power Supply, Chemical Agent Automatic Alarm: M10 (FSN 6665-859-2225).
TM 3-6665-261-24P	Organizational, Direct Support, and General Support Maintenance Repair Parts and Special Tools List (Including Depot Maintenance Repair Parts and Special Tools): Power Supply, Chemical Agent Automatic Alarm: M10 (FSN 6665-859-2225).
TM 3-6665-273-20	Organizational Maintenance Manual Including Repair Parts and Special Tools Lists: Mounting Kit, Chemical Agent, Automatic Alarm: Low Profile, M182 (FSN 6665-110-9492) and Mounting Kit, Chemical Agent Automatic Alarm: High Profile, M228 (FSN 6665-859-2212) for Alarm, Chemical Agent, Automatic: Portable, for Truck 2 1/2-ton, M13 Portable for Truck, 3/4 ton, M12; Portable for Truck, Utility, 1/4 ton, M11 Portable for Full-Tracked Armored Personnel Carriers and Recovery Vehicles, M14; Portable for Carrier Command and Reconnaissance, Armored, M15; Portable w/Power Supply for Truck, 2 1/2 ton, M18 Portable, w/Power Supply for Truck, 3/4 ton, M17 Portable, w/Power Supply for Truck, Utility, 1/4 Ton, M16.
TM 3-6665-274-20	Organizational Maintenance Manual Including Repair Parts and Special Tools Lists: Installation Kits for Alarm, Chemical Agent, Automatic: Portable, for Truck, 2 1/2 Ton, M13 (FSN 6665-479-2718) Portable, for Truck, 3/4 Ton, M12 (FSN 6665-479-2717) Portable, for Truck, Utility, 1/4 ton M11 (FSN 6665-479-2716) Portable, for Full-Tracked Armored Personnel Carriers and Recovery Vehicles, M14 (FSN 6665-479-2719). Portable, for Carrier, Command and Reconnaissance Armored, M15 (FSN 6665-479-2720) Portable, w/Power Supply for Truck, 2 1/2 ton, M18 (FSN 6665-479-2718) Portable, w/Power Supply for Truck, 3/4 Ton, M17 (FSN 6665-479-2717) Portable, w/Power Supply for Truck, Utility, 1/4 Ton, M16 (FSN 6665-479-2716).
TM 3-6665-302-20P	Organizational Maintenance Repair Parts and Special Tools List: Detector Unit, Chemical Agent Automatic Alarm, M43 (FSN 6665-859-2201); Alarm Unit, Chemical Agent Automatic Alarm, M42 (FSN 6665-859-2215).
TM 9-2320-224-10	Operator's Manual: for Carrier, Command and Reconnaissance: Armored, M114 (FSN 2350-860-2349), M114A1 (FSN 2350-987-9536), M114A1E1 (2350-937-6189).
TM 11-6140-203-15-3	Operator's, Organizational, Direct Support, General Support, and Depot Maintenance Manual, Including Repair Parts and Special Tool Lists: Nonaircraft Nickel-Cadmium Batteries.
TM 38-750	The Army Maintenance Management System (TAMMS).
TM 43-0002-31	Destruction of Chemical Weapons and Defense Equipment to Prevent Enemy Use:
TM 740-90-1	Administrative Storage of Equipment.

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APPENDIX B

BASIC ISSUE ITEMS LIST AND ITEMS TROOP INSTALLED OR AUTHORIZED LIST

Section I. INTRODUCTION

B-1. Scope

This appendix lists basic issue items and items troop installed or authorized required by the crew/operator for operation of the M8 and M10 through M18 alarm systems.

B-2. General

This Basic Issue Items and Items Troop Installed or Authorized List is divided into the following sections:

a. Section II—Basic Issue Items List. Not applicable.

b. Section III—Items Troop Installed or Authorized List.
This section lists in alphabetical sequence, items which at the discretion of the unit commander may accompany the end item but should not be turned in with the end item.

B-3. Explanation of Columns

The following provides an explanation of columns found in the tabular listings:

a. National Stock Number. Indicates the National Stock Number assigned to the item and will be used for requisitioning purposes.

b. Part Number. Indicates the primary number used by the manufacturer, which controls the design and characteristics of the item by means of its engineering drawings, specifications standards, and inspection requirements to identify an item or range of items.

NOTE

When a stock numbered item is requisitioned, the repair part received may have a different part number than the part being replaced.

c. Federal Supply Code for Manufacturer (FSCM). The FSCM is a 5-digit numeric code listed in SB 708-42 which is used to identify the manufacturer, distributor, or Government agency, etc.

d. Description. Indicates the Federal item name and, if required, a minimum description to identify the item.

e. Unit of Measure (U/M). Indicates the standard of the basic quantity of the listed item as used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation. When the unit of measure differs from the unit of issue, the lowest unit of issue that will satisfy the required units of measure will be requisitioned.

f. Quantity Authorized. Indicates the quantity of the item authorized to be used with the equipment.

B-4. Abbreviations

Abbreviations	*Explanation*
AWG	American Wire Gage
cond	conductor(s)
F	Fahrenheit
W	with

SECTION III. ITEMS TROOP INSTALLED OR AUTHORIZED LIST

(1) National Stock Number (NSN)	(2) Description Part Number & FSCM Usable on Code	(3) U/M	(4) Qty Auth
6145-00-226-8812	WD-1/TT (81349) CABLE, TELEPHONE 2 cond field wire, stranded, No. 21 AWG, insulated, twisted, 1,320 ft reel, DR-8-A	ft	A/R
	NOTE Any other available and suitable field wire may be substituted for cable listed above.		
8465-00-001-6481	MILF43832MOD (81349) RUCKSACK cloth, metal frame, w/quick release device, w/belt and straps	ea	1
8465-00-782-6722	MILF43356 (81349) SHELF, CARGO SUPPORT	ea	1
	NOTE M253 kit is required for cold weather (20 deg. F. and below) operation.		
6665-00-169-1455	D5-15-6535 (81361) WINTERIZATION KIT, AUTOMATIC CHEMICAL AGENT ALARM, M253	ea	1
6665-00-179-9053	D5-15-5550 (81361) M168 CABLE ASSEMBLY	ea	1
6140-00-134-0850	* BB-501/U BATTERY	ea	2

*Refer to TM 11-6140-203-15-3.

APPENDIX C

MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

C-1. General

The maintenance allocation chart, section II, lists the authorized maintenance functions assigned the maintenance categories for maintenance of the M8 and M10 through M18 alarm systems. This chart is to be used by all levels of maintenance to insure complete support of the equipment.

C-2. Maintenance functions.

Maintenance functions are limited to and defined as follows:

a. Inspect. To determine the serviceability of an item by comparing its physical, mechanical, or electrical characteristics with established standards through examination.

b. Test. To verify serviceability and detect incipient failure by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. Service. Operations required periodically to keep an item in proper operating condition, i.e., to clean, to paint, and replace M229 Refill Kit components in the M43 Detector Kit.

d. Adjust. To maintain, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to specified parameters.

e. Install. The act of emplacing, seating, or fixing into position an item, part, or module in a manner to allow the proper functioning of an equipment or system.

f. Replace. The act of substituting a serviceable like type assembly, or module for an unserviceable counterpart.

g. Repair. The application of maintenance services or other maintenance actions to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module enc item, or system.

h. Overhaul. That maintenance effort necessary to restore an item to a completely serviceable or operational condition as prescribed by maintenance standards in appropriate technical publications. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

C-3. Column entries

Entries for these columns are explained below:

a. Column 1, Group Number. Column 1 lists group numbers, the purpose of which is to identify components, assemblies, subassemblies, and modules with the next higher assembly.

b. Column 2, Component/Assembly. Column 2 contains the noun names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

c. Column 3, Maintenance Functions. Column 3 lists the functions to be performed on the item listed in Column 2.

d. Column 4. Maintenance Category. Column 4 specifies, by the listing of a "work time" (WT) figure in the appropriate subcolumns, the lowest level of maintenance authorized to perform the function listed in Column 3. This figure represents the active time required to perform that maintenance function at the indicated category of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance categories, appropriate "work time" figures are shown for each category. The number of man-hours specified by "work time" figure represents the average time required to restore an item to a serviceable condition under typical field operating conditions. This time includes preparation time, troubleshooting time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart. This time is expressed in man-hours and carried to one decimal place (tenths of hours).

e. Column 5. Tools and Equipment. Column 5 specifies by code, those common tool sets and special tools, test, and support equipment required to perform the designated function.

C-4. Tool and Test Equipment Requirements List — Section III

This list identifies all tools and test equipment required for maintenance and repair of the M8 and M10 through M18 Alarm Systems as specified in the maintenance allocation chart. The list gives tool or test equipment reference codes, user main-

tenance category codes, a short description of items required, and national stock numbers. The tool or test equipment code corresponds to the code in Column 5 of the maintenance allocation chart. The maintenance category code indicates the level of availability and authorized use. All remaining columns are self-explanatory.

Section II. MAINTENANCE ALLOCATION CHART FOR Alarm, Chemical Agent, Automatic: Portable; M8, M10 through M18

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Category * C	O	F	H	D	(5) Tools and Equipment
	The following are components of all the chemical agent alarms:							
100	M43 DETECTOR UNIT	Inspect	0.1					1,2,3,4,5,6,7
		Test			0.5			
		Service	0.2					
		Adjust	0.1					
		Install	0.1					
		Replace	0.1					
		Repair	0.3					
		Overhaul					**	
	Bottom case assembly	Inspect	0.1					2,3,4,5
		Test		0.1				
		Service		0.1				
		Replace			0.1			
		Repair			0.3			
		Overhaul					**	
	Detector unit assembly	Inspect	0.1					2,3,4,5,6,7
		Test			0.5			
		Service	0.2					
		Adjust			0.5			
		Repair	0.3					
		Overhaul					**	
100	Rainshield assembly	Inspect	0.1					1,3
		Service	0.1					
		Replace	0.1					
		Repair		0.1				
	Flow rate meter	Inspect	0.1					3,6
		Test			0.2			
		Service	0.1					
		Replace	0.1					
		Repair		0.1				
	Pump assembly	Inspect	0.1					2,3,4,6,7
		Test			0.5			
		Service			0.2			
		Adjust			0.3			
		Replace	0.1					
		Repair			2.0			
		Overhaul					**	
	Electronic module	Inspect	0.1					2,3,6
		Test			0.2			
		Service			0.1			
		Adjust			0.2			
		Replace	0.1					
		Repair			0.2			
	Chassis assembly	Inspect			0.2			2,3,4,6
		Test			0.4			
		Service			0.1			
		Replace			0.3			
		Repair			0.8			
		Overhaul					**	

*See footnotes at end of chart.

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Category C	O	F	H	D	(5) Tools and Equipment
100	Switch assembly	Inspect						2,3,4
		Test			0.2			
		Adjust				0.2		
		Replace				0.5		
		Repair				0.5		
	Air intake assembly	Inspect	0.1					3
		Test			0.2			
		Service	0.1					
		Adjust	0.1					
		Replace			2.0			
		Repair			0.5			
	Thumbscrew assembly	Inspect	0.1					
		Replace			0.1			
		Repair			0.1			
	Case top assembly	Inspect			0.2			
		Test			0.5			
		Service			0.1			
		Adjust			0.1			
		Replace			0.5			
		Repair			2.0			
	Case top subassembly	Inspect			0.2			2,3,4,5
		Test			0.5			
		Replace			1.0			
		Repair			2.0			
200	M42 ALARM UNIT	Inspect	0.1					
		Test			0.2			
		Service	0.1					
		Install	0.1					
		Replace		0.1				
		Repair		0.2				
		Overhaul					**	
	Panel assembly	Inspect	0.1					3,4
		Test			0.2			
		Service	0.1					
		Repair		0.1				
		Overhaul					**	
	Circuit card assembly	Inspect			0.1			2,3,6
		Test			0.2			
		Replace			0.2			
	The following is a component of the M10, M16, M17, and M18 alarm system: M10 POWER SUPPLY	Inspect	0.1					3,4
		Test			2.0			
		Service	0.1					
		Install	0.1					
		Replace	0.1					
		Repair	0.1					
200	The following is a component of the M14 and M15 alarm systems: M182 MOUNTING KIT	Overhaul					**	
		Inspect	0.1					1,4
		Test		0.2				
		Service	0.1					
		Install		0.4				
		Replace		0.3				
		Repair		0.5				
		Overhaul					**	

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Category C	O	F	H	D	(5) Tools and Equipment
	The following is a component of the M11, M12, M13, M16, M17, and M18 alarm systems:							
	M228 MOUNTING KIT	Inspect	0.1					1,4
		Test		0.2				
		Service	0.1					
		Install		0.4				
		Replace		0.3				
		Repair		0.4				
		Overhaul					**	
	The following is a component of the M11 thru M16 alarm systems:							
	INSTALLATION KITS	Inspect	0.1					1,4
		Test		0.5				
		Service	1.0					
		Install		0.8				
		Replace		0.10				
		Repair		0.1				
	The M253 WINTERIZATION KIT is used with all chemical agent alarms when operating temperatures of 20° F. and lower are expected.							1,4
200	M253 WINTERIZATION KIT components:							
	BB-501/U Battery See TM 11-6140-203-15-3	Inspect	0.1					
		Install	0.2					
		Replace	0.2					
	M168 Cable assembly	Inspect	0.1					1,4
		Service	0.1					
		Install	0.1					
		Replace	0.1					

* The subcolumns are as follows:
C — operator/crew
O — organizational
F — direct support
H — general support
D — depot

**Indicates WT/MH required

SECTION III. Alarm, Chemical Agent, Automatic: Portable; M8, M10 through M18

Tool and Test Equipment Requirements List

Tool or Test Equipment Reference Code	Maintenance Category	Nomenclature	National/NATO Stock Number	Tool Number
1	O	TK-101/G Tool Kit, Electronic Equipment	5180-00-064-5178	TL96416
2	F	TK-100/G Tool Kit, Electronic Equipment	5180-00-605-0079	FPL863
3	F,H	TK-105/G Tool Kit, Electronic Equipment	5180-00-610-8177	PPL927
4	O,F	Multimeter	6625-00-553-0142	TS-352BU
5	H	Patch Kit	6665-00-974-7350	2680
6	F,H	M74 Test Kit	6665-00-854-4147	D5-1555-1
7	F,H	Stopwatch	6645-00-250-4380	GGS764

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By Order of the Secretary of the Army:

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